THE IRON AGE

New York, February 24, 1916

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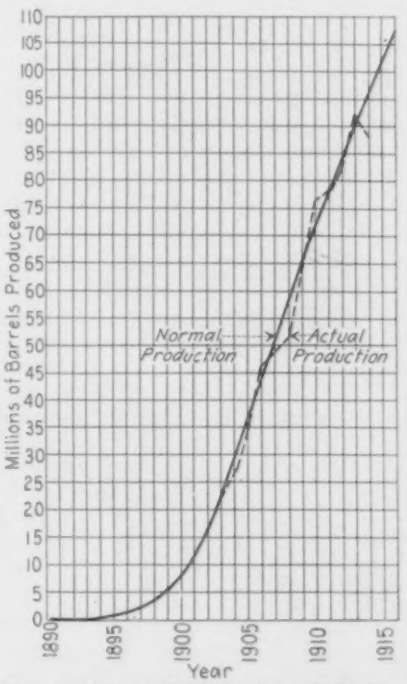
Ascertaining the Status of an Industry

How Price and Production Tendencies May Be Studied in the Light of Actual Average Prices and Production Averages

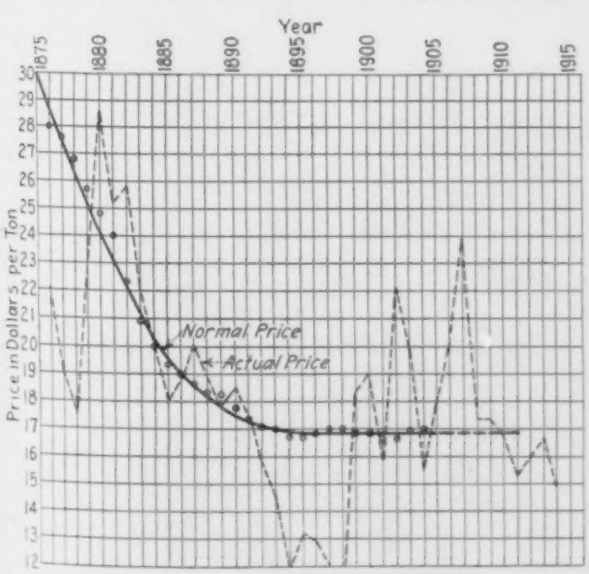
IT IS perfectly obvious that in the case of a young industry, cement for example, statistics of actual prices mean nothing so far as showing the state of the industry at any particular time. Because of the fact that fundamental conditions, such as cost of manufacture and distribution, are changing so rapidly, what may be considered a good price this year may have been an entirely abnormal price, or it may be next year. In studying this subject John J. Porter, first vice-president and general manager of the Security Cement & Lime Company, Hagerstown, Md., conceived the idea of calculating what may be called a normal price curve and laying this down over the curve of actual prices. His view is that the state of an industry at any particular period is accurately shown by the fluctuations of actual prices above and below the normal. The same idea may be carried out in the case of production. The accompanying drawings are reproductions of charts he prepared, accompanied by the following observations:



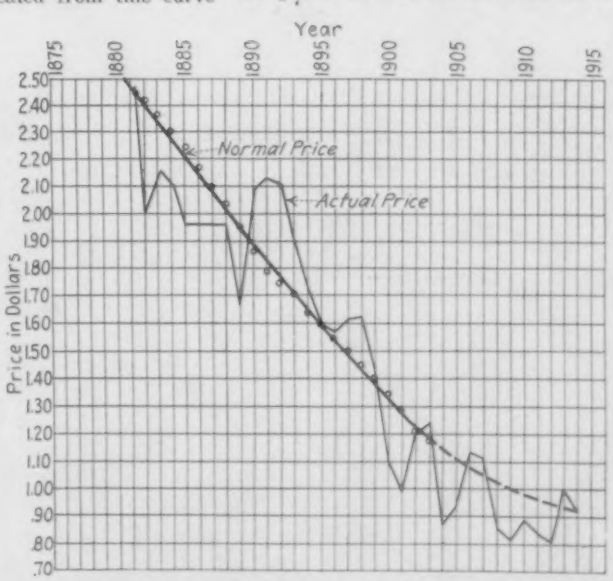
Normal Curve of Production of Portland Cement. The normal production was calculated from the formula that normal production is equivalent to $a\,r^{(n-1)}$, where a = production in year 1880; r = rate of increase; n = number of years after 1880. The value for r was calculated separately for each year, plotted into a smooth curve and values scaled from this curve

The usual price history of an industry is illustrated by the chart showing normal and actual prices of pig iron. While actual prices have fluctuated wildly, average or normal prices have undergone a steady decline, reflecting improvements in methods of manufacture and distribution until comparatively recent years. This industry has now reached that stage of technical perfection in which there is little further chance of a material saving in the cost of manufacture and the curve of average prices has, therefore, become a horizontal line. In time, as present supplies of raw material approach exhaustion, and manufacturers must use poorer grades or more expensive materials, I should expect to see this curve begin to rise.

I have plotted the price of pig iron roughly running back as far as price statistics are available.



NORMAL PRICE OF FOUNDRY IRON, PHILADELPHIA



NORMAL PRICE OF CEMENT

The normal prices are determined by taking averages for 20 yr., including 10 yr. preceding and 10 yr. following each year. The average price of iron for each year is based on THE IRON AGE statistics. The average price of cement is obtained from statistics of the U. S. Geological Survey

This longer curve shows in an interesting way the continuous fall in the normal price during the first half of the nineteenth century, due to improvements in manufacture. A rise in the normal price from the years 1852 to 1870 was due to the approaching exhaustion of the Eastern ore deposits and the sharp decline running from 1870 to 1890, due to the introduction of the Lake ores.

In the case of cement it is obvious that the material has not fully settled down to a stable basis of manufacturing and distribution cost, but it is interesting to note that the indications are for a future normal price, approximately 90 cents per barrel.

BLAIR REVERSING VALVES

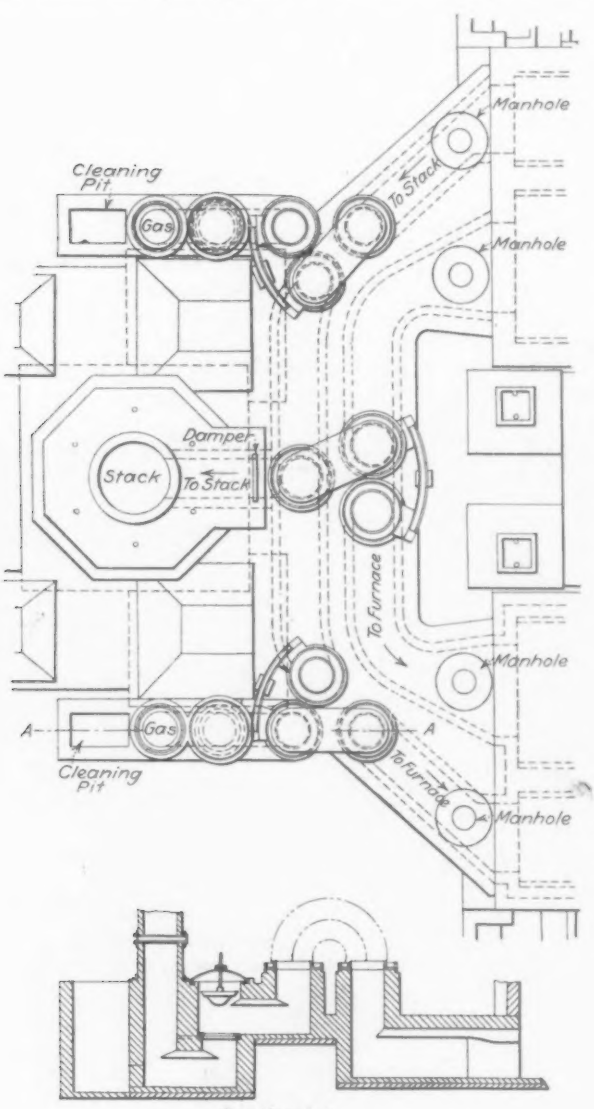
Installation at Open-Hearth Furnaces of Brier Hill Steel Company

A departure in the reversing valve system has been adopted by the Brier Hill Steel Company, at Youngstown, Ohio, in both its open-hearth furnaces and its soaking pits. The flues are completely separated so that gas leaks common in ordinary cases of brick-lined tubes cannot occur. The system employs a swinging section of the flue by which the passage to or from the furnace chambers may be made a continuous flue from the gas producers to the furnace at one end, and from the furnace to the stack at the opposite end, and by which the functions of these flues may be readily reversed without any valve. Each flue is distinct, and completely separated from every other flue, there being no partition walls, with the possibility of leak between gas and draft flues. This scheme, it is held, eliminates the cause of practically all deterioration inherent in all forms of reversing valves, and reduces the cost of maintenance to a minimum.

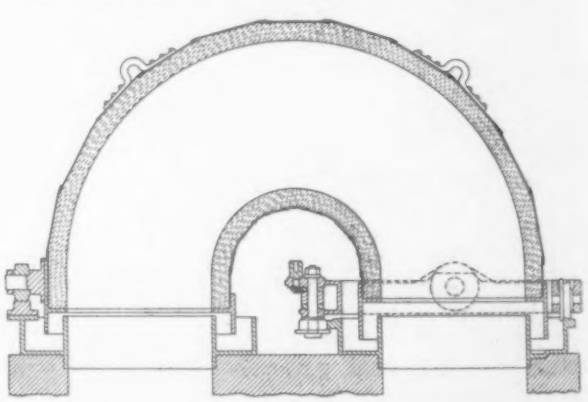
The accompanying drawings show the swinging sections of the flue system. These sections are constructed of steel plate lined with firebrick and have water-sealed connections at each end.

The method of reversing the tubes is apparent. The gas comes from the producers, in either overhead conduits or underground flues, to the regulating valves. The lower one in the plan drawing is open, admitting the gas to the furnace as shown by the arrow, and the air regulating cover is also open, admitting the required amount of air to the same end of the furnace. The products of combustion are passing out from the opposite end of the furnace to the stack.

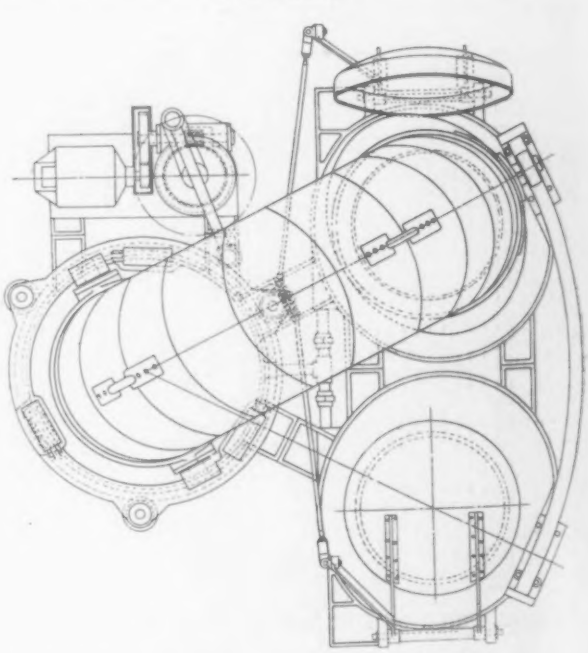
To reverse the furnace the one gas regulating valve is closed by means of a hydraulic cylinder, or motor, which, at the end of its stroke, releases the valve actuating the cylinders or motors, as the case may be, which swing the three tubes over into the reverse position. The other gas regulating valve is now opened by means of its hydraulic cylinder or motor, and the furnace is reversed. In reversing, the gas and air regulating valves are automatically adjusted to the same positions they oc-



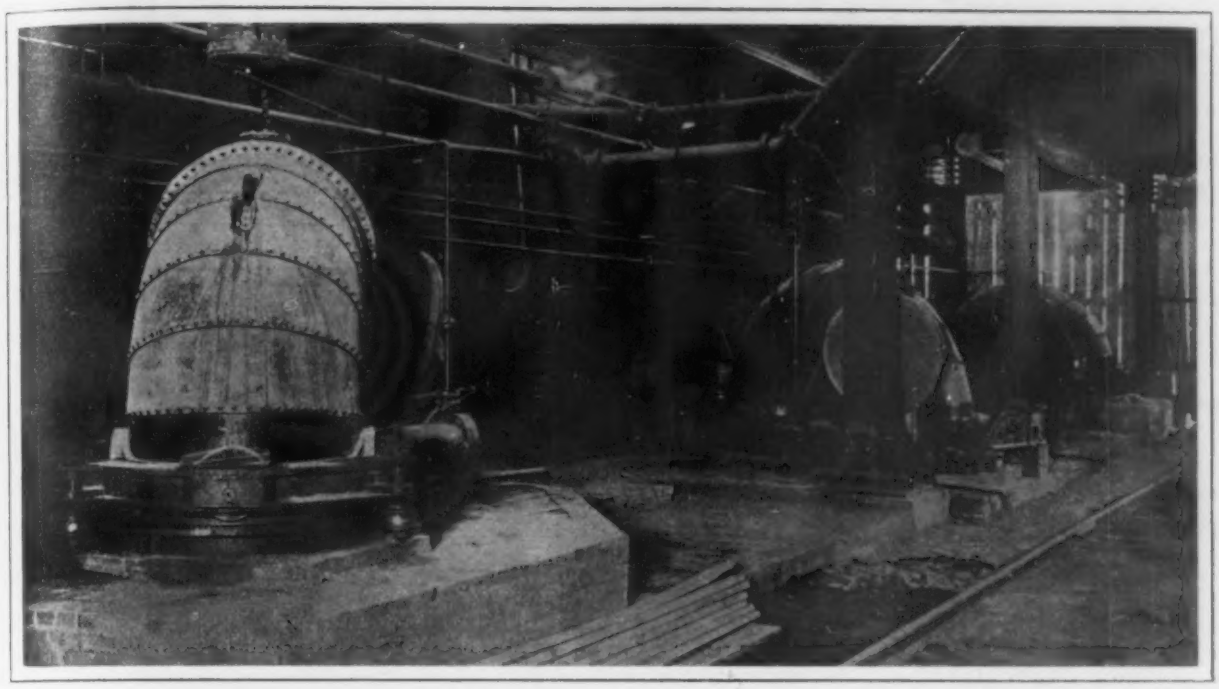
Plan and Section Showing Arrangement of Flues



Details of Construction of Valve Made of Steel Plate Lined with Firebrick



One of the Gas Valves Arranged for Electric Operation



A General View of the Valve Pit

cupied on the previous period of operation on that end of the furnace, so that the amounts of gas and air admitted are the same as they were when the furnace was previously reversed.

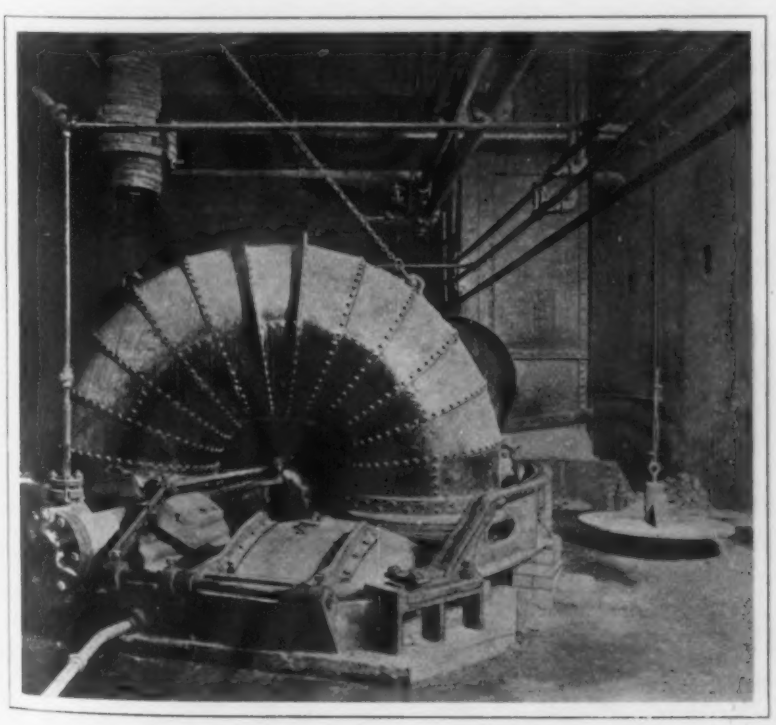
To burn out the flues back of the valves, the tubes are set on center, and both regulating valves raised clear of the flue. Air then enters the tubes and is drawn to the stack through the valves and flues, burning out the soot in the usual manner, and at the same time air also enters the now open seals, burning out the soot, if any, in the short flues leading from the gas valves to the furnace chambers.

When a repair becomes necessary through accident, the gas or air connecting tube is so placed as to become a part of the draft system from the outgoing end of the furnace. If the repair is required on the gas tube, or any part of its mechanism that part is disconnected, breaking the connection through that flue to the stack, which acts the same as putting a damper in that flue. The draft then all passes through the air tube to the stack and the furnace continues to work as usual. If the repair should be required on the air flue connection, this flue is disconnected, and the draft passes through the gas tube to the stack.

Besides eliminating the possibility of a leak from either gas or air flues to the stack, or between the gas and air flues, some of the other advantages are enumerated as follows: All parts of the mechanism are exposed, cool and accessible. Any part of the device can be repaired, or replaced, without shutting the gas off the furnace. The cost of maintenance is reduced to a minimum. Gas is saved in reversing.

The only water supplied to the valves at the Brier Hill plant is the overflow from the stack damper. The gases do not come into contact with the water, an advantage when waste-heat boilers are used. The gas explosions that frequently occur under the waste-heat boilers at the time of reversing the furnace are eliminated, it is stated, because no gas escapes to the stack in reversing. Another economical application is its use as a burn-out for the gas flues, in place of the sand-damper or inclosed valve commonly used. A tube of 30-in. in internal diameter is used for this purpose, operated by means of a hand winch, and is inexpensive, is found to remain tight and dependable.

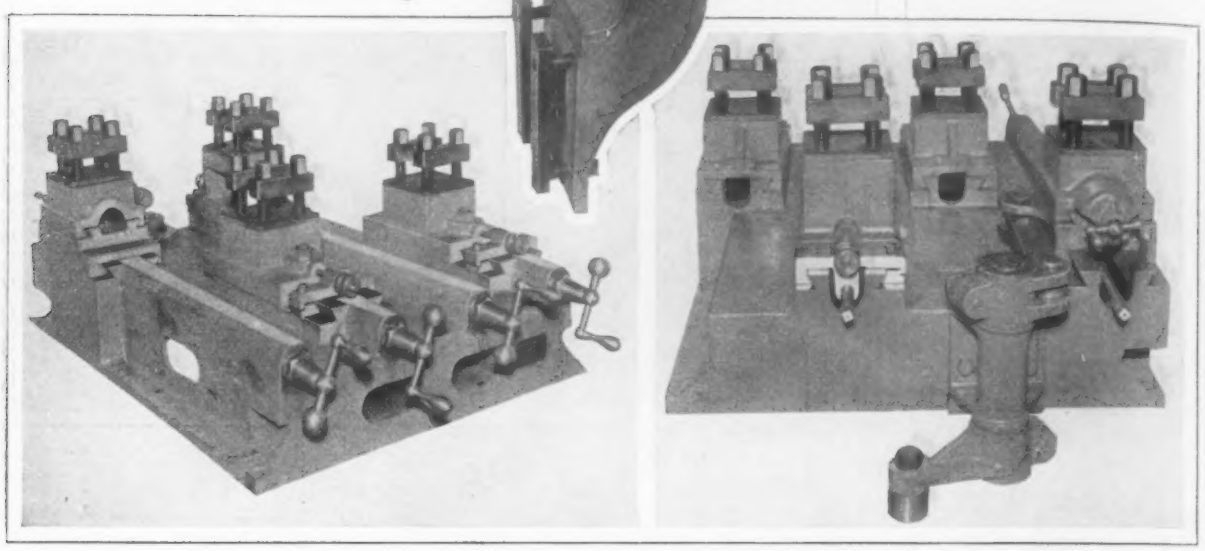
The system described was developed by the Blair Engineering Company, New York and Chicago, and has been adopted by the Inland Steel Company in the equipment of its new open-hearth plant now under construction. The photographs here reproduced are views of the valves at the works of the Brier Hill Steel Company.



Hydraulically Operated Gas Valve

Shell Turning Attachments for Lathes

Four-Tool Carriage and Expanding Mandrel Made Here for French Munition Manufacturer for Use on Standard American Machine Tool

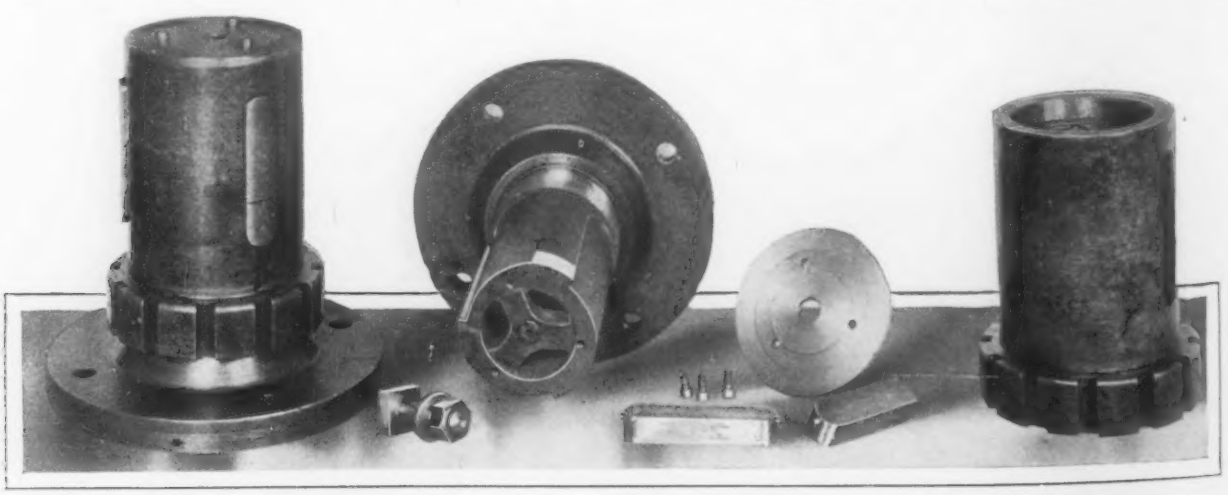


Front and Rear Views of a Specially Developed Four-Tool Lathe Carriage for Turning Shell Blanks and Bracket for Controlling the Tool Producing the Tapered Portion

Two interesting devices for use in the manufacture of munitions have been built by the Jersey City Machine Company, 115 Plymouth Street, Jersey City, N. J. These were developed to suit the particular requirements of a French shell maker and were especially designed for attachment to a standard 36-in. triple geared lathe built by the Niles-Bement-Pond Company. The attachment consists of a four-tool carriage for mounting on the carriage of the lathe in place of the ordinary rest and an expanding mandrel for attachment to the faceplate for driving the shell blanks during the machining.

The purpose of these two attachments is to enable a blank for an 8-in. shell, for example, to be turned to the proper diameter for the finishing operations and to have the exterior wall tapered to provide the necessary thickness of material for the nosing operation that is subsequently performed. A section of the shell blank as it is placed in the lathe is presented at the top of the accompanying line drawing, while the middle portion shows the blank after leaving the lathe. Especial attention is directed to the amount of material that has been removed from the outside of the blank, 7.5 mm. on each side, and the position of the taper that is cut near one end. This view, however, is not a true section of the shell blank as it leaves the lathe, as the shell has been cut off in this drawing and a boss formed on the opposite end, both of which are done subsequently in another machine. In other words, it is simply the function of these attachments to reduce the outside diameter of the blank and cut a taper. Some idea of the amount of metal that is removed may be gained from the weight of the three pieces of metal shown in section, which are respectively 283.8, 184.8 and 147.4 lb.

In machining these blanks a set of distance pieces is placed in the shell blank and rests against the closed end of the blank. The mandrel is attached to the faceplate of the lathe by four bolts and the shell blank is slipped over this, the distance pieces referred to resting against the end of the mandrel and thus insuring accurate duplication of work. After the shell is in place on the mandrel a

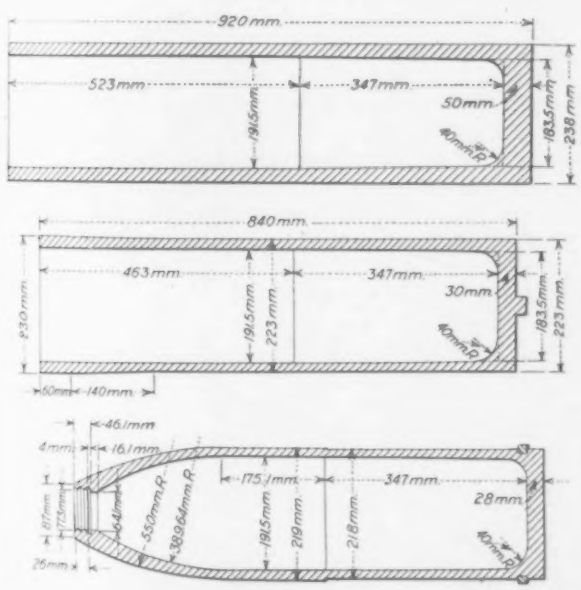


The Special Mandrel Used to Mount the Shells in the Lathe

spanner wrench is inserted in the slots of the outer sleeve. The movement of this sleeve causes the tool steel jaws placed in the slots in the sleeve to move along the cam surface of the inner member of the mandrel until they bear tightly against the inner surface of the shell blank. In this way the shell is held rigidly in place. To guard against the entrance of dust and dirt which would interfere with the operation of the mandrel, an end plate is secured to the mandrel by three screws.

After the shell has been placed on the mandrel, the tool carriage comes into use. This mounts four tools at predetermined distances on the shell. Two of the tools rest against the front of the blank and the other two, including the one that forms the taper, bear against the back. All of the tools are controlled in the customary manner from the front of the lathe by the regular ball crank handle, lock nuts being provided to prevent an excessive motion of the tools toward the work. The two tools cutting on the rear of the blank, and particularly the one employed for producing the taper, have a means of adjustment at the back. The pairs of tools on either side of the blank are mounted in the carriage so that the cutting point is exactly at the center line of the blank. The travel of the carriage along the bed is secured in the regular way by engaging the longitudinal feed.

The cutting of the taper is controlled by a special bracket which fits in the track provided on the back



The Blank Before and After Machining and the Finished Shell

of the lathe for the standard taper attachment. It will be noticed in the view of this bracket that the set of ways or guides on the upper portion of the bracket are tapered in the reverse direction to that of the finished taper in the shell. This is taken care of by the mechanism controlling the movement of the taper cutting tool which derives its motion from a roller sliding between these guides. This motion is magnified and reversed in direction by the mechanism to secure the proper taper on the finished shell.

While the mandrel and the carriage were made to meet the requirements of a particular lathe, it is stated that they can be adapted to any other standard machine tool by such modifications as may be necessary to make them conform to the changed dimensions of the lathe or the method of securing the taper attachment bracket in place, no changes in the essential design being required. In the case of the mandrel, too, the changes needed to enable it to be used on other tools are matters of dimensions only rather than marked structural changes.

THE CRUCIBLE SITUATION

One Crucible Maker's Experiences and Expectations—Substituting for Foreign Clays

The crucible manufacturers have been put to straits for the past eighteen months in securing their raw materials. First came the embargo on Ceylon plumbago. This was lifted after a few months, but the market was left in a depleted condition. Next came the exhaustion of the foreign clay used in crucible making as a binder. The clay as far back as crucible history in this country goes has come from the little principality of Klingenburg in the Black Forest in Bavaria, where, so the story goes, the entire Government expenses are paid out of the export duties collected from the clays shipped out. This Klingenburg clay has for years past been the only clay the crucible makers seemed to think they could satisfactorily use. No shipments of this clay have been made since the beginning of 1915. Some makers have husbanded the supplies of the foreign clay they had on hand when hostilities started. This has been done in part by substituting clays from various parts of the United States and mixing with the Klingenburg clay.

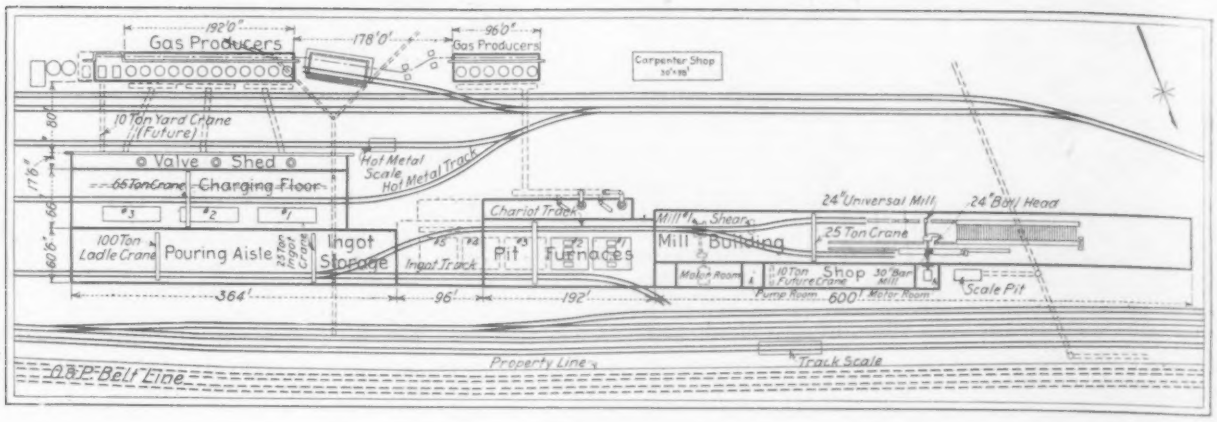
One crucible maker says the tests and trials made in the past twelve months have been almost endless. It appears that it takes six to ten weeks to prepare a graphite crucible for service in the foundry. Meanwhile, the chemical laboratory tests and trials must be made. Then must come the practical tests in a small way in the foundry before the crucible maker would dare to use up his supply of Ceylon plumbago, costing 17½ to 25c. per pound.

The bright side, however, is that in many cases the crucibles made with American clays have gone a surprisingly long time in the fires. In one case there is a report on a No. 300, which ran 40 heats on manganese bronze, and numerous cases as high as 38 and 40 heats on No. 100 crucibles melting car box metal. The annoyances now seem to be the ununiformity of the products secured. Crucibles made by the same potter out of similar materials and at the same time and burned in the same kiln, when run by one melter on the same grade of metals, show a wide variation.

All this, it is held, will in time be rectified, as soon as the manufacturer has become more familiar with the mixing and blending of our native clays. The user, however, it is emphasized, must use more care in handling the American clay crucibles. It is imperative that they are thoroughly dry and warm before going into the fire, and that they are heated up very slowly on the initial heat. Some users make a little fire with charcoal inside the crucible, and others put hot ashes in, before placing the pot in the fire, so that the crucible is hot when it goes into the fire for the first heat. Advantages are claimed for heating the crucible from the inside first rather than the outside.

The advance in prices of crucibles is due to the present unusually high price of Ceylon plumbago; but as soon as the war insurances are a thing of the past plumbago, it is agreed, will be at a normal figure once more, and crucibles will again be marketed at as low or lower prices than they have been for many years past.

The Atlantic, Gulf & Pacific Company, Park Row Building, New York City, has prepared a circular for general distribution covering a water front property in Brooklyn for manufacturing sites. This is on Jamaica Bay in outlying Brooklyn and is served by an 18-ft. channel, which gives a water connection to the various railroad terminals at New York harbor. At the present time the National Lead Company has its Crooke works at this site and the Gulf Refining Company has a distributing station and the Atlantic, Gulf & Pacific Company repair shops for its dredges and other equipment.



The New Steel Works at Lowellville, Ohio

Youngstown Iron & Steel Company Now Supplies Bars and Universal Plates to Its Nearby Sheet Mills and Pressed Steel Department

Nearly twenty-two years ago, or, to be exact, on Jan. 26, 1894, a small company known as the Youngstown Iron & Steel Roofing Company was organized at Youngstown, Ohio, with a capital of $12,000 for the purpose of manufacturing and selling roofing, eaves trough and conductor pipe made from sheet steel. The company prospered from the start, and on Jan. 18, 1898, the capital stock was increased from $25,000 to $300,000, this increase of $275,000 having been made to provide funds for the erection of four hot sheet mills, one set of cold rolls and a galvanizing department containing one pot. Prior to this time, the company had been buying its sheets in the open market, but with the steady growth of its business it decided to manufacture them. On Jan. 8, 1910, the capital stock was further increased from $300,000 to $1,200,000, and on Nov. 8, following, the name of the corporation was changed to the Youngstown Iron & Steel Company. The number of hot sheet mills had in the meantime been increased to eight, a plate mill and jobbing mill had been added, and, in fact, the entire plant had been greatly increased in size and a more general line of products was being manufactured.

At a special meeting of stockholders held April 29, 1914, the capital stock was increased from $1,200,000 to $3,000,000, divided into 22,000 shares of common stock and 8000 shares of preferred stock of a par value of $100, and an issue of bonds not to exceed $1,000,000 was authorized for the erection of an open-hearth steel plant. The success attained by this company and the fact that at times, owing to unusual conditions, it was unable to obtain a prompt supply of steel and sometimes of the quality it desired, led officials of the company to believe that in order to round it out properly and carry on more successfully the manufacture of its different lines of products, its own steel plant was imperative. This would then assure a regular supply of steel of the quality desired.

The site selected for the new open-hearth steel plant was at Lowellville, Ohio, about 3½ miles from Haselton, where its present sheet mills and pressed steel works are located. The company made a

Charging Floor of Open-Hearth Furnaces of Youngstown Iron & Steel Company, Lowellville, Ohio

favorable contract with the Ohio Iron & Steel Company, operating Mary blast furnace at Lowellville, for a supply of hot metal to be used in its open-hearth furnaces, which are only a few hundred feet from the Mary furnace. The open-hearth plant and the blast furnace are connected by a private railroad, which the company built itself, and over which hot metal is carried in 40-ton ladles to the charging platform of the open-hearth furnaces. The first work on the building of the new plant was done in July, 1914, and in one year afterward, or on July 31, 1915, the first ingot was poured.

The new plant, on which Julian Kennedy, Pittsburgh, was consulting engineer, comprises three 75-ton open-hearth furnaces, 18 gas producers, a 24-in. universal plate mill and a 30-in. bar mill. The products consist of billets, slabs, universal plates and sheet bars, and the output of sheet bars is put at close to 500 tons daily. The open-hearth department is located on the side of a hill and retaining walls were built at several points, these serving a double purpose, one forming a side for the coal storage pit, while another will be used later for carrying the rails for a traveling crane to be installed over the storage yard. The storage yard and charging platform are 18 ft. above the floor level of the pouring floor and the duplex mill, and the gas producers are located 10 ft. above the storage yard and charging platform, so that the works have three different floor levels.

The open-hearth building is 308 ft. long and 126 ft. wide, the charging floor being 66 ft. wide and the pouring aisle 60 ft. The entire building is of steel construction, sheeted with galvanized copper-iron alloy, and has a monitor type roof. The crane rails are 39 ft. above the floor level, and the height to the eaves line is 54 ft. The three open-hearth furnaces are located in the east end of the building, and the hot metal scales of the Fairbanks type in the southwest corner.

The ladles after reaching the charging floor are handled by a 60-ton Morgan charging crane. The open-hearth charger is also of the Morgan type, and the scrap in charging boxes is brought from the storage yards by two Brown hoisting machines, used also for general yard service. The stock yard is about 50 ft. wide and extending the length of the mill building, has an estimated capacity of 15,000 tons. It is intended later to install a 10-ton crane for storage yard service. The dolomite and ferro-manganese are stored in a pit at the extreme east end of the building and are taken from the pit by the charging crane. The furnaces are provided with water-cooled burners designed by one of the foremen, and are fired by natural gas. It is intended later to install a producer plant. Provision has been made for increasing the number of furnaces east of No. 3 furnace.

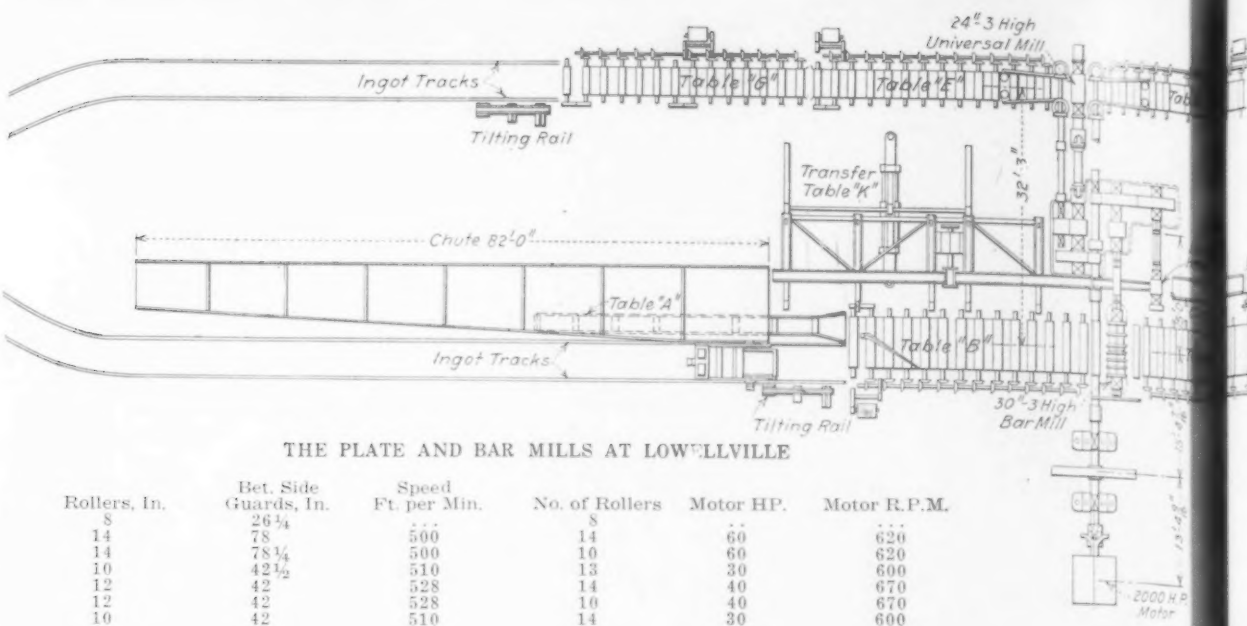
The pouring ladles are of 100 tons capacity, and are handled by a Morgan 150-ton crane of 55-ft. span, and there is a 25-ton Morgan ingot crane, and of course electric jib cranes for handling the spouts. All ingots are bottom poured, the arrangement of the molds and a movable platform being shown in one of the accompanying illustrations. The steel is poured from a ladle into a central mold, from which it passes to the adjacent molds, 25 being poured at one time. The operation of ingot pouring is controlled by a workman stationed on the movable platform, which is shifted from one set of ingot molds to another as the pouring is done.

The soaking pit furnaces are contained in a building 72 ft. wide and 192 ft. long. They are of four-hole capacity and are commanded by a 10-ton Cleveland crane. A 24-ft. bay is built adjacent to the soaking pit building for the gas equipment. The soaking pits are now fired with natural gas, but later on it is intended to use producer gas.

The plate and sheet bar mills are in a steel building 600 ft. long and 56 ft. wide, and adjoining this building on the north end is a 27-ft. bay, which contains motor and pump rooms, the machine shop and a testing laboratory. The three-high 30-in. bar mill and the 24-in. universal plate mill, of which an illustration is given, were built by the William Tod Company, Youngstown, Ohio. This department is commanded by a 25-ton Morgan crane.

The mill is unusual in design and is intended to meet the requirements of a steel plant which desires to produce a wide range of products with a minimum amount of equipment, and with a minimum number of changes of rolls and interruptions in operation. It is essentially a duplex mill consisting of a one-stand three-high bar mill and a three-high universal plate mill, both driven from the same pinion housing, and so arranged that either mill may be used while the other is not in operation. The mill is provided with a common hot bed and receiving and shear table, the shear being mounted on ways so that when operating the bar mill the shear

Ingots Are Bottom Poured in the Open-Hearth Steel Plant of the Youngstown Iron & Steel Company



THE PLATE AND BAR MILLS AT LOWELLVILLE

Table	Rollers, In.	Bet. Side Guards, In.	Speed Ft. per Min.	No. of Rollers	Motor HP.	Motor R.P.M.
A	8	26¾	...	8	..	...
B	14	78	500	14	60	620
C	14	78¼	500	10	60	620
D	10	42½	510	13	30	600
E	12	42	528	14	40	670
F	12	42	528	10	40	670
G	10	42	510	14	30	600
H	10	42	500	36	60	620
J	10	42	600	36	60	590
K	11	15	565	7*	30	600

The bar shear: 5½-in. stroke; 26 cuts per min.; 5-in. opening of knives; 15-hp. motor.
The 500-ton slab shear: 7½-in. stroke; 16 cuts per min.; 7-in. opening of knives; 75-hp. motor.
Hot bed transfer: 60 rails spaced 24 in.; 11 dogs; speed of transfer, 250 ft. per min.; 60-hp. motor.

*One roller driven; 6 idlers.

is located at the runout table from that mill, and when the universal mill is being operated, the shear serves the table from the universal mill.

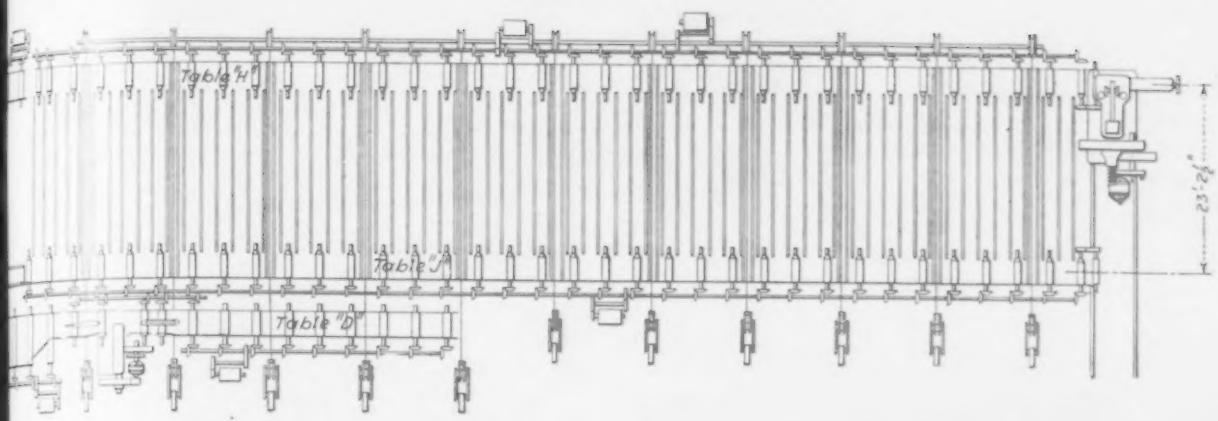
The bar mill is designed to reduce an ingot to a tin bar, which is finished in a separate stand or bullhead, so called. The universal mill is capable of rolling sheets or skelp up to 36 in. wide and 100 ft. long. The duplex arrangement is to obviate delays due to break-down and necessary expense of repairs on Sunday or other times when a mill is not in operation, because it is possible to operate one mill when the other is idle, this being done by changing or shifting gears, an operation requiring but a few moments. There are, for example, no changes in guides or guide bars required in changing from slab ingots or standard ingots, the ingot car being diverted by means of a switch to tracks leading to the universal or the bar mill, as the case may be.

Electric power is used. A General Electric 2000-hp. motor, operating at 2200 volts, takes current furnished by the Mahoning & Shenango Railway & Light Company, this entering the plant at 22,000 volts and stepped down by transformers. A 700-hp. motor-generator set in the motor room provides for other purposes.

After passing the 24-in. bullhead rolls, the sheet bars are transferred to the cooling bed, the bars being sheared by a slab shear equipped with a 40-in. knife and with a capacity for shearing at one stroke four ¾ x 8-in bars. This shear is mounted on a truck and rails, being shifted from one side of the bed to another to accommodate the alternate operations of the universal and sheet bar mills, as stated. The sheet bars drop into a water box for cooling, and the box is then lifted out of the pit by the crane, the scale is removed and the bars are then loaded into a shipping cradle.

The gas producer plant comprises 18 producers, 12 of which are for the open-hearth furnaces and six for the soaking pits. They are of the Laughlin

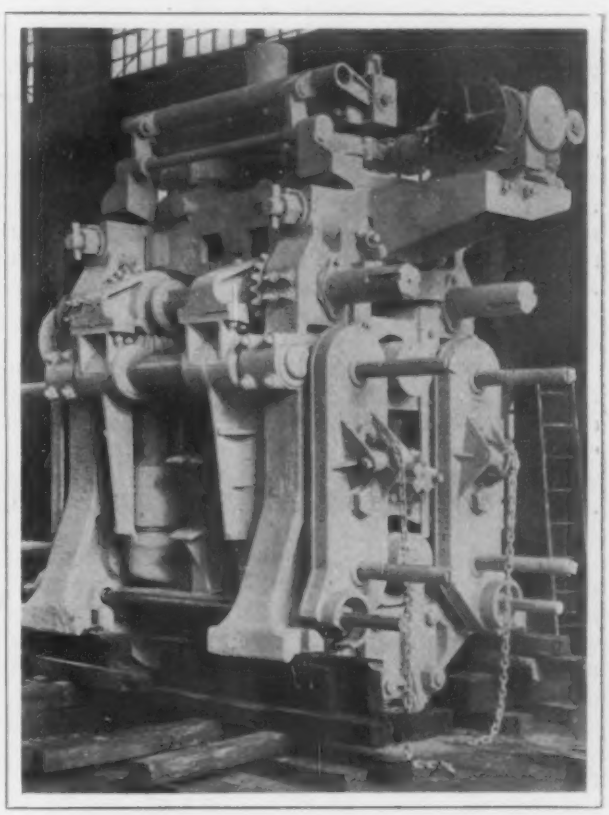
Cooling Bed, Which Takes from Bar Mill at the Left and Plate Mill at the Right



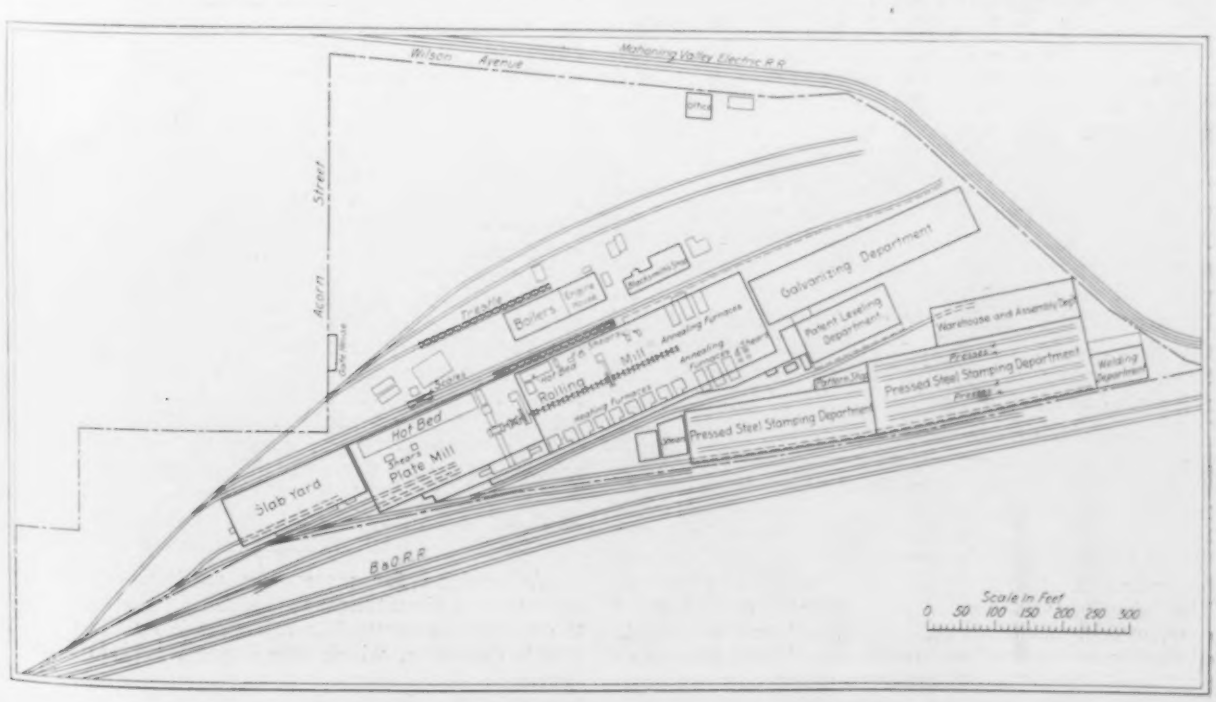
hand-fired type and are furnished with steam from two Stirling water-tube boilers. The producers are spaced on 16-ft. centers, with a total length of 192 ft. The 12 producers for the open-hearth furnaces are built in a continuous series with the boilers at the east end. A continuous pit for handling coal and ashes parallels the producers on the south for the entire distance and extends to the boilers. This pit is commanded by a monorail, provided with a 1½-yard grab bucket. The distance from the bottom of the pit to the monorail track is 19 ft. 9 in. The gas producer house is constructed of concrete and steel. The monorail tracks pass over a large storage pit at the west end of the producers; and also extend to the six soaking pit producers. These are located 178 ft. west of the open-hearth producer building.

Two Cameron 5-in. six-stage centrifugal pumps are employed for furnishing water, rated to deliver 600 gal. per minute at 550-lb. pressure. This is said to be the first installation in this country of this type of pump of such large capacity. Each pump is directly connected to a 300-hp. motor. All water, after being used, is filtered and returned to the pumping system. A Scaife filter system was installed. The water is run through a lime tank into a large agitating tank. After sedimentation the clean water is put into two 16,800-gal. tanks. The filter house and tanks are located adjacent to the gas producer boiler house.

The testing laboratory is located in the rolling



Three-High Universal Plate Mill



The Sheet Mills and Stamping Department at Haselton

mill annex and is unusually well equipped. A machine for conducting physical tests is provided, together with a small electric furnace, a tin bath and a gas annealing furnace. All the laboratory furnaces are under pyrometric control. The chemical laboratory is located in the temporary office building. The machine shop is equipped with two drilling machines, 42-in., 18-in. and 14-in. lathes and a shaper.

The welfare and general interests of the employees are carefully looked after. A first aid hospital is provided with facilities for taking care of minor injuries and also for giving first aid treatment in case of more serious accidents. The hospital is under the supervision of an attendant who also serves as safety director.

THE HASELTON WORKS.

The entire output of sheet bars, which will run close to 500 tons per day, is to be used by the company in its sheet mills at Haselton. These comprise eight sheet mills, a plate mill, a jobbing mill and expanded metal, metal lath, roofing and pressed steel departments. The plate mill is of 72-in. 3-high type, rolling plates up to 60-in. in width. It has a monthly capacity of about 5000 tons. The jobbing mill is 30 x 60 in., with 2-high finishing mills, and roughing rolls of the same size. On this mill sheets are rolled up to 54-in. wide and from 1/40 up to 3/16 in. in thickness.

The galvanizing department is equipped with three roller galvanizing machines designed by the company's own engineers. These handle sheets up to 54-in. in width and varying in thickness from 9/64 to 1/80 in. The other sheet mill equipment includes one hot mill 29 x 48 in., one 29 x 42-in., one 29 x 40-in., three 29 x 36-in., and two 29 x 32-in. mills. These sheet mills are provided with the usual equipment of roughing stands, sheet and pair furnaces and roller levelers. There are four stands of cold mills, also four 4-box coal fired annealing furnaces, two roller levelers for handling cold sheets and two hydraulic stretching machines.

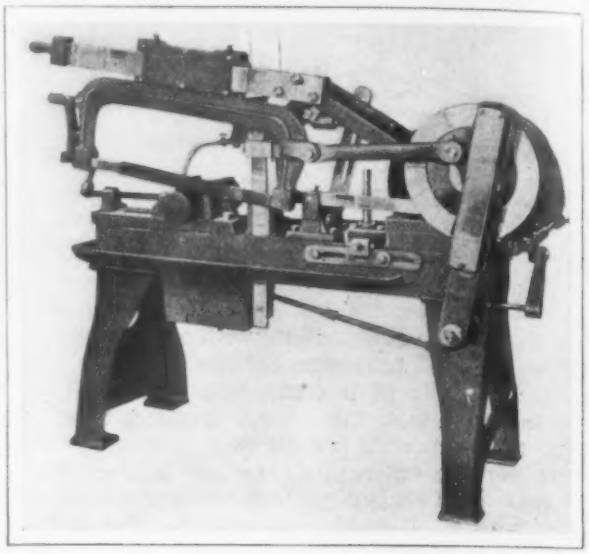
The pressed steel department was put in operation on Nov. 8, 1905, with G. F. Danielson, general manager, who continues in that capacity. This department has about 60 presses to turn out stampings varying in weight from 50 pieces to a pound to single pieces weighing 500 lb. The output consists very largely of specialties used in the agricultural implement and automobile industries. Electric spot welders and acetylene gas outfits form a part of the equipment. Dies are made in the company's own tool room.

The officers are John O. Pew, president and general manager; H. W. Heedy, first vice-president; C. A. Cochran, second vice-president and secretary; Mason Evans, treasurer; C. B. Cushwa, general superintendent, and C. F. Danielson, manager pressed steel department. These officers with C. D. Hine and L. B. McKelvey constitute the board of directors. Mr. Cushwa, who joined the Youngstown Company in 1901, had been superintendent of rolling mills at the Republic works of the National Tube Company, Pittsburgh.

Facilities are afforded by the mechanical division of the Mayor's Bureau of Weights and Measures, 244 West Forty-ninth Street, New York, for testing and proving the pull per pound and percentage of stretch in air or in water disclosing the strength or weakness of paper. The laboratory at the address given is open from 9 a. m. to 5 p. m. each business day, and written reports of tests are rendered to applicants without charge or fee for the service. Samples may be sent by mail. Joseph Hartigan is commissioner.

Hack Saw Machine for Large Rounds

A heavy-duty power hack saw machine, designed particularly for cutting round stock ranging from 6 in. in diameter downward, has been placed on the market by the Diamond Saw & Stamping Works, Buffalo, N. Y. Tight and loose pulley drive and an automatic lift for



A Power Hack Saw Machine Designed for Use on the Large Rounds Employed in the Manufacture of Shrapnel

the saw blade on the return stroke are incorporated in the machine, together with a somewhat peculiar type of construction and design which provide a cutting speed of between 50 and 55 strokes per minute.

It is emphasized that this slow speed of operation adds to the life of the saw blade, which is important in view of the large amount of high-carbon and manganese steel rounds that are being cut at the present time. With a new blade and only the normal amount of weight on the frame, it is possible to cut 3½-in. round stock in between 3 and 4 min. A record of 32 cuts with one blade has been made on this size of round bar which had a high carbon and manganese content, the average time required for each cut being 5½ min.

The automatic lift provided for the saw blade is relied upon to raise the blade positively on the return stroke at all times. The use of tight and loose pulleys in the drive, it is emphasized, does away with trouble sometimes encountered where a clutch is used for driving.

Structural Business in January

The records of the Bridge Builders and Structural Society, according to the statistics collected by George E. Gifford, its secretary, show that in January 69 per cent of the entire capacity of the bridge and structural shops of the country was put under contract. This is to be compared with 121 per cent for December and 109 per cent for November. The average for the last six months is 87½ per cent, while that for the preceding six months is 64 per cent. This shows that in the last six months over 35 per cent more tonnage was fabricated than in the preceding six months. From the Chicago structural market report of the issue of Feb. 17, it is noted that the average tonnage per job in the last six months was 115 tons against 175 tons for the half year preceding. This indicates that while there was about 35 per cent more work in tonnage contracted for the average job required only two-thirds as much steel per job, and thus there were about twice as many contracts signed.

A machine for measuring yardage on the store counter and simultaneously indicating the total cost of the material measured is being made by the Measuregraph Company, which was incorporated in Missouri March 1, 1914. Recently the company took new quarters at 2109 Olive Street, St. Louis.

The Manufacture of Washed Metal*

A Description of the Process at the Brier Hill Steel Company—The Chemistry Involved and the Theory of the Removal of the Metalloids

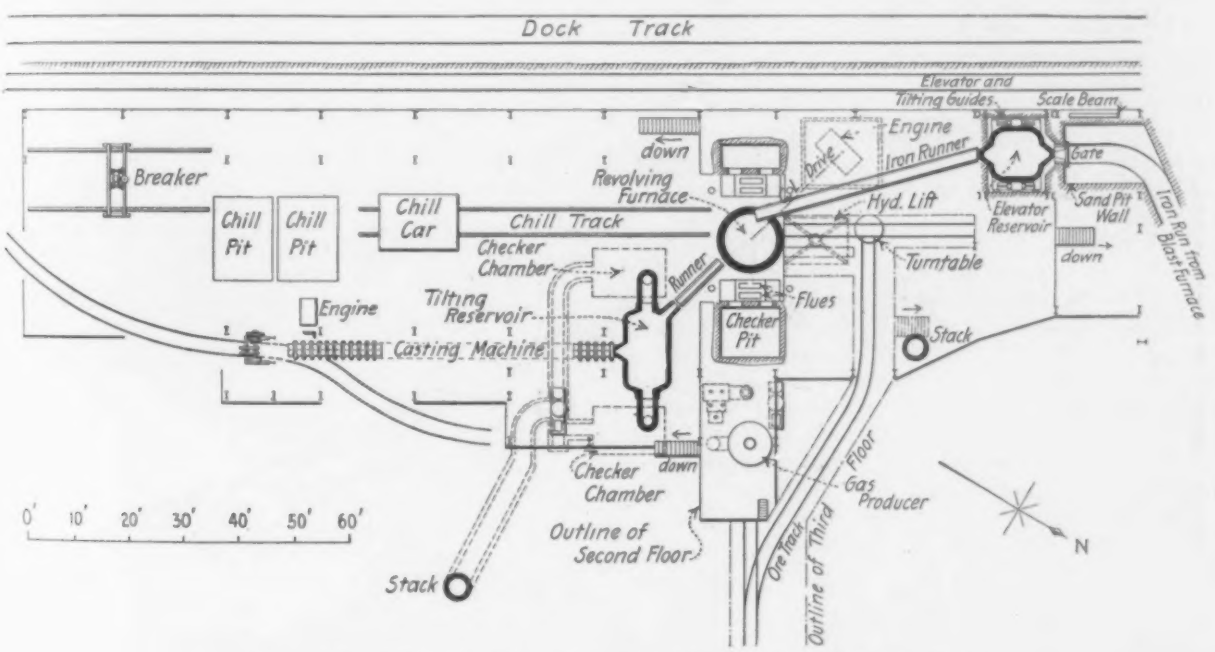
The process of making washed metal now followed is in principle that described by Holley before this Institute in 1879, as the Krupp washing process. Sir Lowthian Bell also experimented extensively in England during 1877 and 1878 on refining iron and joined his interest with Krupp, the process being often referred to as the Bell-Krupp process. The only plant in this country now operating this process is that of the Brier Hill Steel Company, Youngstown, Ohio. This process may be considered as the sole survivor of the numerous methods conceived for refining crude iron, when the removal of phosphorus from steel-making material was the great desideratum affecting large districts.

The east coast of England and all northern Germany, the homes of Bell and Krupp, respectively, could at that time make steel only from imported ores. These processes were in use or in various stages of development forty years ago and all except the Bell-Krupp received their quietus from the development of the basic steel processes, both pneumatic and open-hearth. The aim of the early refining processes was, first, the removal of the silicon, which could be done on a sand bottom, and later, the removal of the phosphorus, requiring a bottom which would give or permit a basic slag. The incidental advantages of increased yield and small fuel consumption were not generally recognized or considered; the aim of the later operations was the saving of the difference in value between low and high phosphorus irons, as well as hastening the removal of the metalloids.

The chemistry of the washing process follows in part that of the puddling process, and indeed washing might be considered as the first half of puddling, since all the non-ferrous elements of the crude iron, except the carbon, are eliminated and the iron is maintained molten until cast. In puddling, the iron loses its carbon as well, and because of that, its fusion point rises above the hearth temperature; it freezes into a pasty malleable form, and is worked at once by squeezer, hammer, or rolls.

Since Holley's paper, important improvements have been made from time to time in both plants and methods for washing iron, and the degree of purification attained is far greater than Krupp accomplished, particularly as to phosphorus, though Bell's results approximated those of the present practice. The costs have been diminished as well.

The use of washed metal is limited. It is in request now only as an exceedingly pure iron and is used, first, in acid steel processes, solely for the reason of its purity, as in open-hearth and Bessemer steels of high grade; and, second, because of its high carbon contents (3.25 to 3.50 per cent) as well as purity, as a carburizer in crucible steel.



Washed Metal Plant of the Brier Hill Steel Company, Youngstown, Ohio

BRIER HILL WASHING PLANT

The washing plant of the Brier Hill Steel Company is placed near one of its blast furnaces, which supplies it with molten crude iron. It consists briefly of a reservoir, a Pernot furnace, a reheating furnace and a casting machine.

The reservoir is about 100 ft. or more from the blast furnace, a runner in the floor of the cast house conducting the stream of molten crude iron to it from the furnace. It has a brick lining 18 in. thick, is of 50 tons capacity, and is mounted on top of the ram of a vertical hydraulic cylinder, which straddles a 100-ton weighing scales. It is provided with mechanism for tilting to pour the metal. Fifty tons of iron make four washed-metal charges, which take about 1 hr. each to work, and, since the blast furnace is tapped every 4 hr., the reservoir provides a continuous supply of iron to the washing plant.

*From a two-part paper presented by Henry D. Hibbard, Plainfield, N. J., and Edward L. Ford, Youngstown, Ohio, before the American Institute of Mining Engineers, New York, Feb. 16.

The reservoir receives iron when at its lowest position, is raised by the hydraulic plunger about 15 ft., and discharges to a short open runner which conducts the molten crude iron to the Pernot furnace. Iron has been held molten in the reservoir 48 hr. with the help of a small oil jet, and then washed without difficulty.

The Pernot furnace in which the washing is done differs in many details from the Pernot furnaces which have been described. In fact, nothing of the original furnace remains and hardly any of the details of the original design, though the general plan is the same. The changes made have resulted in greater durability and efficiency, but even now, the cost of repairs is an important item in spite of the relatively low temperature of the operation.

The pan, as the circular hearth is termed, was originally designed to revolve on wheels, but now runs on conical rollers, which are kept spaced by a spider. The rollers travel on a circular track below the pan, turning in the same direction as the hearth, but at half the speed. On the bottom of the pan is a circular track on which it travels over the rollers. The pan is driven by a bevel pinion engaging a gear on the bottom of the pan. The pan lining is so thin (8 in.) that water is continuously sprayed upon the bottom, from underneath, to keep it cool.

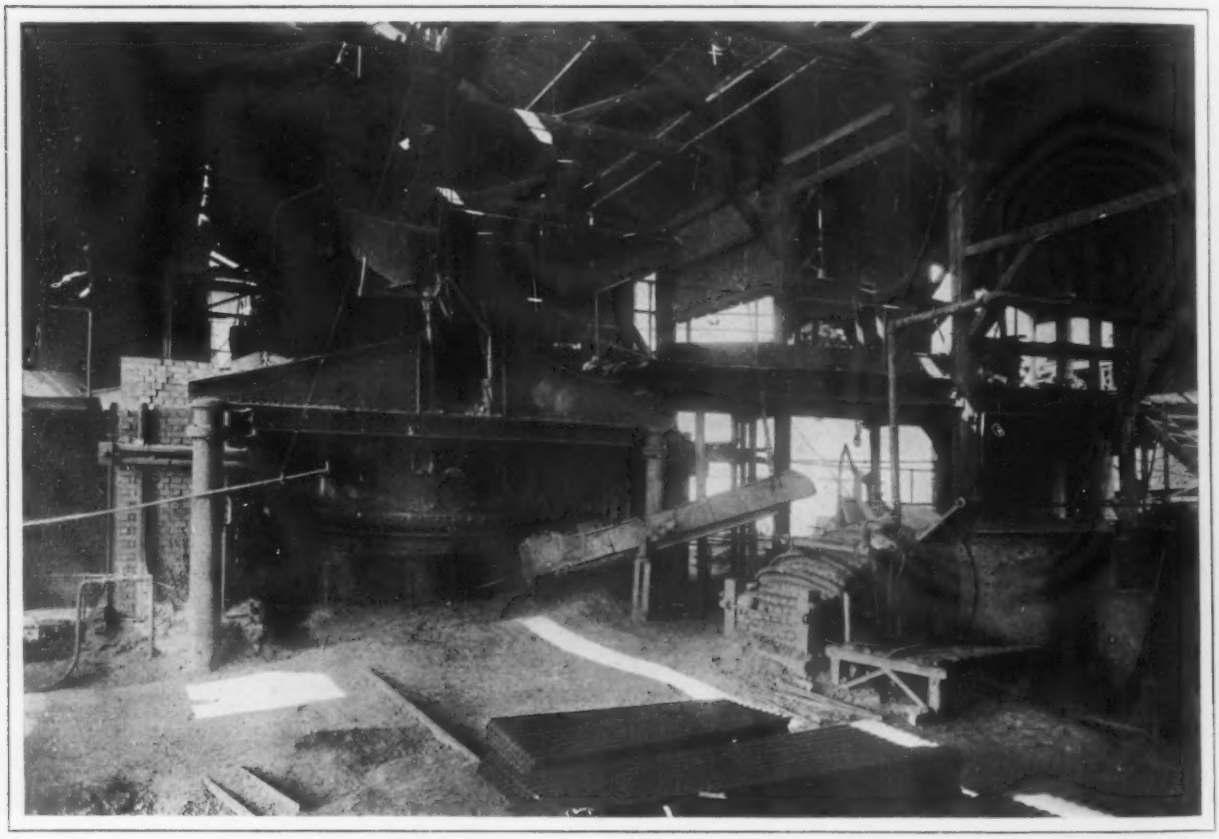
In the superstructure, at one side of the single operating door on the charging side and above the pan, is an opening with which the crude-iron runner from the reservoir is connected and through which the molten iron is charged into the furnace. In the side of the pan near the bottom is a tap hole and near the top a slag notch. A hole through the furnace roof connects with an ore chute through which the ore is shot for fettling the hearth after each charge has been drawn off.

One circular gas producer supplies gas for the use of the furnace. The ability of a single producer to run this plant depends on the fact that the coal used contains only about 1.5 per cent ash, with 44 to 46 per cent of volatile matter, and will not coke under any circumstances. This makes it possible to carry a fire 8 ft. or more deep, and drive at a high rate with a steam injector for the air, without having above 2 per cent CO_2 in the gas. This coal in earlier days was used raw in the blast furnaces of the neighborhood without other fuel for making pig iron and is in this respect like the Scotch coals.

A section of the floor, 10 by 10 ft., on the charging side of the furnace, is arranged to be lowered, which is done after each heat is run out, providing a place for the men to stand to repair the tap hole and cinder notch, the pan being revolved so that these openings are on the high side.

After a heat has been run out, the furnace is drained; any holes in the hearth are puddled out and filled with iron ore, and the fettling, consisting of dampened ore, is run down in successive batches through the roof, the hearth being revolved a little at each dose, so that the bank of fettling is continuous around the hearth. The gate of the ore chute above is controlled by the melter from the working platform by means of overhead levers. While the banks are thus being built up, the bottom is covered with ore thrown by the shovelful through the operating door. The ore used for bottom making and fettling is a high-grade specular hematite, broken into pieces from the size of a hen's egg down, with enough fine ore to make a compact mass without voids. Between 20 and 30 min. are consumed in repairing the bottom and fettling. The tap hole and cinder notch are cleaned out and plugged with sand.

The firing is then resumed to heat and set the fix, the reservoir is raised, and 12 tons of iron is run into the pan, which is then started revolving. A reaction immediately takes place between the oxygen of the ore and the silicon, phosphorus and



Front View of Washing Furnace, Showing Tipping Receiver for Holding Washed Metal While Casting in the Machine on the Right

manganese of the iron, the bulk of these elements being eliminated in a few minutes, by passing into the slag which is formed. The small percentage of carbon which goes off during the operation (3 to 5 per cent) makes enough CO gas to give a vigorous boiling action, throwing jets of slag 3 to 5 in. above the bath at first when the temperature of the bath is greatest.

About 15 min. after the crude iron has been charged the slag is made to run off through the slag notch. This slag contains most of the oxidized silicon, phosphorus and manganese from the crude iron, and perhaps a quarter of the sulphur. A second slag is then formed by additions of lime, which, with the ore melted from the fettling, takes up more of the phosphorus and sulphur of the iron. These slags are rich in iron and are therefore smelted afterward in the blast furnaces for making basic pig.

Tests are taken from time to time, averaging about five to a heat, to determine the degree of dephosphorization. The test is a circular cake about 5 in. in diameter and 1.25 in. thick in the center, being thinner at the edges. This cake is broken into pieces. The test contains a myriad of small bubbles and has a faint crystalline or columnar structure normal to the bottom surface. The lower the phosphorus, the larger the bubbles and the fainter the crystalline structure mentioned. With very low phosphorus, bubbles as large as 1/16 in. in diameter may be found within ¼ in. of the lower surface, with smaller ones still lower and larger ones up to ¼ in. in diameter near the upper surface.

The whole washing operation takes about an hour, the most of this time being consumed in securing the extremely low phosphorus content required. When ready for casting, the tap hole is turned to the proper position on the pit side of the furnace and is then dug open by means of a hand bar.

The metal runs from the furnace fairly well, but looks cool, almost of an orange temperature, perhaps not over 1250 deg. C. It gives off copious brown fumes, as well as scintillating sparks and CO gas, which burns, the whole making a brilliant effect and, when viewed from a distance, gives one the impression that the metal is hotter than it really is.

CASTING THE METAL

For casting the metal two means are provided: The one generally used when the product is for domestic consumption is a broad shallow cast-iron pan on a car, which runs on a track leading from the Pernot furnace down the center of the cast house. The charge is run out into this pan, where it forms a single plate from 4 to 6 in. thick, and the car is then drawn away from the furnace to cool. Water from a hose is played upon this plate for a few minutes, while hot, to loosen any slag which may come out after the metal and is not trapped off while casting. When the cake of metal is cool enough to be moved without breaking, but is still red hot, it is lifted from the car with a crane and put in a pit. Water is then turned on and it is flooded until cold enough to handle, when it is broken up into one-man size chunks, either with a sledge or by a traveling breaker. This is not difficult, because the water cooling has filled it with cracks, which go clear through the plate. These cracks seem to have no system, except that they are always at right angles to the upper and lower surfaces of the plates, leaving the pieces very irregular in outline.

The other casting method, usually employed for export orders, is to run the washed metal without the slag, into a 12-ton tilting, oil-fired regenerative furnace, located at a lower level, where it is held about 15 min., heated, and poured directly into the molds of an endless-chain casting machine, which moves at the rate of about 15 ft. per minute. The

Storage Yard for Washed Metal at the Brier Hill Steel Company, Youngstown, Ohio

joints between the tilting hearth and the stationary ends of the reheating furnace are packed with asbestos, which closes them tightly and will endure the moderate temperature, say 1350 deg. C., fairly well.

The metal is a little hotter than when it left the Pernot furnace, but is still of an orange heat. In the molds the metal is puffed up by gases being evolved, but settles more solidly soon after being cast, leaving a fin standing up all around each pig. For casting into this form, an extra charge is made. The yield of washed metal is about the same as the weight of the original crude iron charged.

CHEMISTRY OF THE WASHING PROCESS

The crude iron contains: Silicon, 1 to 1.25 per cent; sulphur, 0.02 to 0.03 per cent, and phosphorus, 0.090 to 0.10 per cent. All of the silicon and manganese, 90 to 95 per cent of the phosphorus, and 30 per cent of the sulphur are eliminated. The silicon and manganese with 75 to 80 per cent of the phosphorus leave the iron in 10 min. and 30 per cent of the sulphur in 15 min. The silicon, manganese and phosphorus are removed by oxidation, while the sulphur seems to be eliminated by liquation, the sulphide of iron getting into the slag mechanically without oxidation. At certain high temperatures, the affinity of sulphur for oxygen seems to be weaker than its affinity for iron. The slag takes sulphide of iron from the metal until equilibrium is established between the proportions of sulphide in the two, when no more will pass. When a second slag is formed, some of the sulphide will enter that, making the elimination from the metal more complete. Should the slag have too much sulphide, as has happened when some blast-furnace slag got in with the crude iron, some of the sulphide will pass from the slag into the metal, and in that way establish the equilibrium.

Individual heats of washed metal have been made having as little as 0.002 and even 0.001 per cent of phosphorus, and it has been furnished on specification of 0.006 phosphorus and under. When iron heavily charged with carbon, like washed metal, lies molten in contact with molten oxide of iron, there will be, if the heat is high enough, a continuous oxidation of carbon to CO until the temperature falls to a certain degree, when the action will cease. That reaction is endothermic and the consumption of heat automatically brings the temperature down to that point. This temperature has not been determined, but there is ground for suspecting it to be near 1300 deg. C.

ANALYSES OF METALS AND SLAGS

Typical analyses of crude irons with washed metals and slags therefrom are given below:

The Metals

	Pig Iron, Per Cent	Washed Metal, Per Cent
Silicon	1.25	none
Phosphorus	0.095	0.010
Sulphur	0.020	0.015
Manganese	....	none
Combined carbon	....	3.40

Final Slags

	Per Cent
Silica, SiO_2	16.50
Manganese oxide, MnO	6.50
Lime, CaO	8.50
Phosphoric acid, P_2O_5	1.05
Sulphur, S	0.075
Ferrous oxide, FeO	50.25
Ferric oxide, Fe_2O_3	16.90
	99.775

THE REMOVAL OF METALLOIDS

The rate of silicon removal is constant to about 95 per cent, when it begins to become less rapid. This, I think, is due entirely to the want of perfect mobility of the slag and metal, and therefore to the fact that the silicon is not present in equal amount in all parts of the metal at this stage of the process. In fact, it must take an appreciable amount of time for the metal in the center of the mass to reach iron oxides on its surface.

Manganese seems to behave in the same way, although the rate of removal is a little less rapid. Its retardation at the end is due to the same causes.

The phosphorus removal-rate is constant to about 70 to 75 per cent, when retardation sets in, and progressively increases. The long time required to remove phosphorus, as compared with silicon and manganese, would make the lack of mobility at this stage a factor of practically no consequence; but, after the elimination of silicon, carbonic oxide begins to be formed; and (as Pourcel showed very clearly, in the early days of the basic Bessemer process, in the discussion on the necessity for the overblow to remove the phosphorus) phosphorus cannot be removed from iron when CO is being formed intermolecularly in quantity; and no doubt the proportion of phosphorus removed is inversely related to the amount of CO formed, during a given period. True, the formation of CO, by lowering the temperature of the bath, tends to stop itself; but it completely ceases only when the metal is so cool that it begins to set; and this, of course, impairs the fluidity necessary to bring new surfaces of metal in contact with the slag, in order to oxidize the small amount of phosphorus left. We, therefore, finally reach a point of equilibrium when the CO formed just reduces the amount of phosphorus oxidized. If we increase the heat of the furnace, to increase the fluidity of the metal, we increase again the amount of CO that can form, and so are no better off.

THEORY OF THE ELIMINATION OF SULPHUR

Our theory of the elimination of sulphur I have never seen formulated and would hesitate to report it here, if I were not trying to give the *rationale* of the washing process, as we have known it. Even at quite a low temperature, sulphur appears to form sulphides, preferably to oxygen compounds; and as the temperature increases, this tendency seems more marked. In neither the blast furnace, the converter, the open-hearth, or the puddling furnace, nor in our washing process, is the sulphur removed, except as a sulphide. In roasting sulphurous iron ores, however, it does go off as SO_2; but this process, as is well known, is performed at as low a temperature as possible. Our view is that for any given temperature, atmosphere, slag, and metal composition, the amount of sulphide in the slag bears a constant ratio to the amount in the metal. That there is an equilibrium, so to speak, which cannot be altered without a change in one, at least, of the controlling factors above mentioned. In our own process, as carried out by us, the ratio seems to be one in the metal to five in the slag, or, to put it another way, a slag with 0.10 per cent sulphur will give a metal with 0.02, and to get 0.01 per cent sulphur in the metal, the slag must not have more than 0.05 per cent. As corroborating this proposition, the two following incidents may be interesting:

On one occasion, pig iron with 0.025 per cent sulphur was run into the washing furnace at a time when an accident at the blast furnace had let some blast-furnace cinder get into the receiver together with the pig metal. Some of this cinder ran with the metal into the washing furnace. The resulting washed metal carried 0.04 per cent sulphur. With our ordinary practice this would have been about 0.017 per cent.

Some washed metal with 0.015 per cent sulphur was melted in a cupola with coke. The resultant metal ran 0.10 per cent sulphur. Some white iron with 0.10 per cent sulphur was melted in the same cupola. Result: sulphur, 0.11 per cent. We had on our yard a heat of washed metal, containing 0.09 per cent sulphur. This was melted in the same cupola. Result: sulphur, 0.12 per cent. These results seemed to point to from 0.10 to 0.12 per cent as the equilibrium point in the resultant metal from these operations, no matter what sulphur the metal contained to start with.

Low-sulphur washed metal is the only marketable product; hence we aim to keep the sulphur in our pig iron as low as we can, with low-silicon iron. Our "fix" ores contain a little sulphur; the gas from our producer carries a little; and our limestone a little; so that the resulting slag, if none came from the pig iron, would run about 0.03 to 0.04 per cent as a minimum. Our practice shows us that, in a metal containing 0.007 per cent sulphur, this would give us no removal.

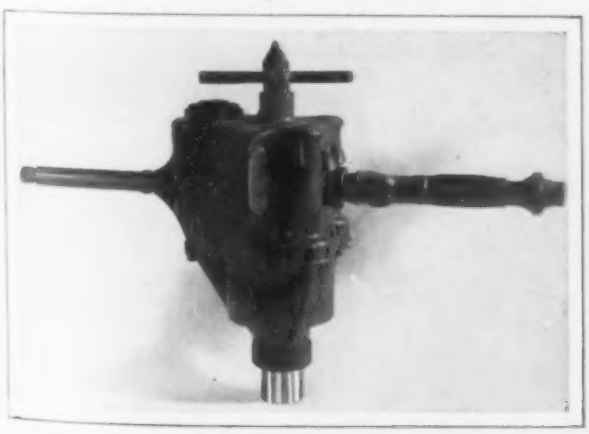
If we could obtain raw slag materials absolutely free from sulphur, our washed metal would be 0.007 per cent lower in sulphur with our regular pig iron than it is now. If we were satisfied with 0.05 per cent sulphur in our washed metal, we could use a pig so high in sulphur that the amount taken out would probably approximate 60 per cent, rather than 30, as now; for when we formed our second slag, it would be capable of taking up a considerable portion of this remaining sulphur, before reaching the equilibrium point.

If the other conditions incident to the process permitted it, we could, by making new slags, reduce any amount of sulphur in the pig to about 0.01 per cent, but we could never get much lower than that, no matter how low the pig was, as long as our slag-making materials were as high in sulphur as they are now. Our experience teaches us, however, that the blast furnace is the best and cheapest desulphurizer.

Heavy-Duty Portable Pneumatic Drill

A compound geared type has been added to the line of portable pneumatic drills built by the Ingersoll-Rand Company, 11 Broadway, New York City. It is designed for flue rolling, drilling, reaming and tapping, and as it is reversible it can be used for running flexible staybolt sleeves up tight or for setting locomotive valves.

The construction of the drill, with the exception of the addition of the gearing, embodies all the features

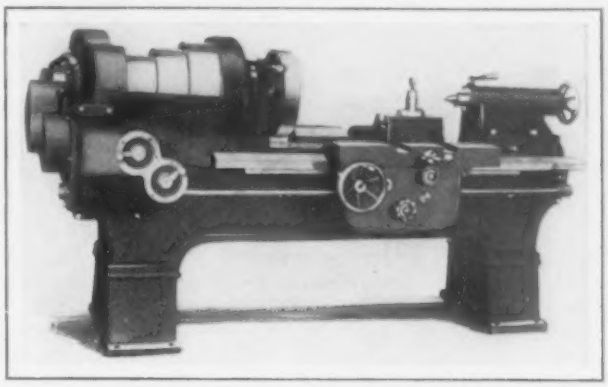


A Compound Geared Portable Pneumatic Drill for Flue Rolling, Drilling, Reaming and Tapping

found in the standard drill which was illustrated in THE IRON AGE, Jan. 22, 1914. Ordinarily the drill is equipped with a No. 5 Morse taper socket. The normal speed of the spindle is 100 r.p.m.

A Heavy-Duty 20-In. Engine Lathe

The Economy Engineering Company, Willoughby, Ohio, has brought out a new 20-in. heavy-duty lathe which, while it might be considered a single-purpose machine, is in a class by itself in that it has the necessary features of an engine lathe. It is said to be particularly well adapted for forgings and heavy turning work, owing to its weight, rigidity and large size of parts. This lathe is provided with 18 spindle speeds, ranging in geometrical progression from 11 to 335 r.p.m., and has six feed changes of the positive geared type obtained through a quick-change gear box. The head is back geared in a ratio of 3.17 to 1 and 11 to 1, the back gears being of the double type operated by positive clutches.



A 20-In. Lathe Combining in One Tool the Features of a Single-Purpose Machine and an Engine Lathe

The headstock is of the drop brace type with the outside housing brought up to the center line of the cone pulley which has three steps for a 5-in. double belt. The high-carbon steel spindle has a No. 6 Morse taper, and a hole 2 1/16 in. in diameter extending its entire length.

The bed is of unusual vertical depth. The rear carriage bearing is flat and the front bearing is a wide V, to resist the thrust of the tool in all directions and increase the rigidity of the machine. The carriage has a bearing 32 in. long on a bed, which is 20¾ in. wide, and is clamped down at the rear with a special device to insure the easy movement of the carriage without backlash. The bridge is 11 in. wide, giving ample bearing for the cross slide. The apron is of the box type constructed so that the shafts have a bearing at both ends. The headstock, feed box and apron bearings are bronze bushed. The countershaft has double friction pulleys 18 in. in diameter for 5-in. belts. The speed of the countershaft is 185 and 225 r.p.m.

The following table gives the principal dimensions and specifications of the lathe:

Length of bed, ft	8
Swing over ways, in	22
Swing over carriage, in	13
Distance between centers, in	37
Diameter of front spindle bearing, in	4
Length of front spindle bearing, in	7
Diameter of rear spindle bearing, in	3½
Length of rear spindle bearing, in	5
Diameter largest cone pulley step, in	16¾
Approximate weight, lb	5,100

The regular equipment includes plain rest, face plate and countershaft, but if desired a compound rest, a square turret tool post on cross slide and a four-hole turret mounted on the ways in place of the tailstock and fitted with power feed will be furnished. It is stated the only feature not included in this machine is a screw-cutting attachment.

The Lukens Iron & Steel Company, Coatesville, Pa., has made application to the State Highway Department of Pennsylvania for permission to build two steel bridges over the Lincoln Highway. One will carry a standard gage and the other a narrow gage track, and both will be used to convey supplies to the four new open-hearth furnaces now under construction.

British India's Railroad Development

Great Trunk Line Proposed—Roads of Varying Gages to Be Standardized—Possibility of a New Market for Americans

BY JOSEPH KING GOODRICH

The call which British India is making to American iron and steel manufacturers is one that should be given serious attention. This statement is peculiarly and most forcefully true in its bearing upon railroad construction, but it is not made with any intention of supporting the idea that the present deplorable European war gives the merchants, manufacturers, and exporters of the United States at this moment the fair opportunity to "capture" something. Such a view, absolutely unethical in its very essence and every phase, is without sufficient evidence in fact to justify its utterance. To undertake the "capture" of trade or industrial fields, simply because others who have had a certain prescriptive right to those domains are temporarily unable to fill the calls made upon them, is one which must bring about a reversal to former conditions as soon as the immediate cause of that temporary suspension of normal conditions is removed.

But if the opportunity which is now given to show that the products of the United States mills and factories are undoubtedly as good as, or better than, and are as cheap as, or more reasonable than what such markets—hitherto not open to us because of affiliation or prejudice—have been obtaining from other sources is accepted in the right spirit, the results may be of advantage to the purchasers in markets which may be termed "new" for American producers and of benefit to the United States in a permanent way, and cannot justly be resented by European suppliers who would be compelled to admit that excellence of material, or reasonable price, or any other of the recognized factors in such transactions has been demonstrated in a perfectly fair and ethical competition that cogent reasons had thitherto prevented.

RAILROAD CHANGES AND EXTENSIONS

The railroad system of British India is not at all homogeneous. The gage of the different lines is not uniform, varying from what we know as the "standard" (there are now none of the old English broad, 6-ft. gage) down to the minimum of the "narrow." For this reason, passengers and merchandise that have to make a long journey must necessarily change, and frequently make several changes. This, it does not need saying, involves expense and unprofitable delay, undesirable and widespread factors, which the government of India is trying to eliminate by standardizing all the narrow-gage lines which in any way may be immediately, or in the proximate future will be, considered necessary in the broad scheme of railroad development which is being actively prosecuted.

In carrying out this commendable plan, the government finds it necessary to build entirely at least one important new line and a considerable number of short, feeding lines. But that scheme, in its widest, grandest phase, contemplates the construction of a great through trunk line, from the eastern end of such existing lines in Asia Minor as are available, to Karachi, on the western coast of Hindustan, Sind Province, and just north of the mouth of the Indus River, where junction is to be had with the whole Indian system, when the standardizing and linking up that have been mentioned are completed.

EXTENT OF THE GREAT TRUNK LINE

This trunk line has already been preliminarily surveyed and tentatively laid out, subject, of course, to such minor or important changes as conditions which arise, as the work progresses, may make necessary or desirable. Leaving out of present consideration such railroads in Turkey-in-Asia (and, possibly, elsewhere) as may subsequently be incorporated, this great trunk line, as at present contemplated, is to be, in main sections, as follows:

	Length, Miles	Cost per Mile, Rupees	Total Cost
Boulgour to Aleppo..	270	214,000	394,975,000 rupees, or $136,266,375
Aleppo to Basra....	700	135,000	
Basra to Gwadar...	1,069	175,000	
Gwadar to Karachi..	360	125,000	
Total length.....	2,399		

This expenditure will provide a single track line, yet one that will be amply provided with sidings and subsidiary tracks at all divisional points and important stations. It is, however, seriously contemplated by the government to build at once a complete double-track line throughout, since experience has taught constructing engineers that while this method involves a very heavy outlay, although much less than to lay two single tracks, yet eventually such added expenditure proves itself to have been the wisest economy when in operation, and it is believed this can be promised within three years, or five at the longest.

The distance from London, the capital and metropolis of the whole British Empire, to Calcutta, the metropolis of the British Indian Empire, if this claim for the former capital is admitted, will be 6875 miles. In sections, it is as follows:

	Miles
London, via Calais, Lille, Cologne, Nuremburg, Vienna, Sophia and Adrianople to Constantinople	2,034
Constantinople to the eastern boundary of the Persian Empire	2,615
Persian border to Karachi, Hindustan	415
Karachi to Delhi	908
Delhi to Calcutta	903
Total	6,875

When the improvements which are even now being made between Kitah and Mawra in northern Hindustan shall have been completed, the total distance will be reduced by some 234 miles, to 6671 miles. The cooperation of the several non-British governments, across whose territories through trains will run, is reasonably assumed. At Calcutta connection will be afforded with the eastern Indian and Burmese systems, and (when the latter are in full operation to Bhamo) with the Chinese system.

The British Indian Government is constantly advertising for tenders from those who wish to build its new railroad lines, or to widen, shorten, or otherwise improve existing lines. And there is absolutely no prejudice shown as to the nationality of bidders, save that present "enemies" are considered totally ineligible if any were to be so indiscreet as to tender. There is practically no import duty on such materials, either for construction or operating, and absolutely none when they are to be used for government purposes. The only factors taken into consideration in awarding contracts are price, reliability and integrity of bidders, and ability to fulfill the terms of contract.

ADVANTAGE SHOULD BE TAKEN OF THIS PROJECT

Here is one of the opportunities suggested in the first lines of this article. Unfortunately, it has been the rule heretofore for the Indian Government to limit the period in which tenders must be submitted to such a brief time as to make it impossible for Americans to hand in their bids. This, however, has not been done with any deliberate intention of cutting off our countrymen but simply because the relatively small contracts had thereto been readily accomplished by local

contractors. But, in the matter of the great European-Indian line, as well as in the case of other long lines which are contemplated, it may well be that Americans will find it worth while to enter the lists.

This being admitted, the obstacle which the present brevity of the period for submitting bids seems to present may readily be overcome by either one of two courses of procedure: First, for a few of our great concerns to make a representation to the British-Indian Government that if the period be lengthened sufficiently to permit of those concerns receiving plans and specifications, with full particulars of the contract, and then to submit tenders, it may—indeed, probably will—be to the advantage of that government. Second, for such American concerns to establish their own responsible agents in India, completely supported by all the necessary financial and moral backing, who shall be able to submit bids as soon as such are called for. That the second plan is preferable must be manifest to all who can be interested, because there are not only the prospects for remunerative business which are now in sight but many others that are to come up most surely in the near future.

INDIA AT LAST AWAKENING

British India, strange as the statement must sound, is only awakening now from her restful peace of centuries, and beginning to find herself. Few of our industrialists realize how earnest is the determination of that great empire—with its 300,000,000 inhabitants—to take the position in the world to which it is rightly a claimant. This statement does not for a moment imply that British India contemplates independence. On the contrary, the European war, instead of revealing a disposition on the part of the British Indians to cast off the tie which binds them to the imperial government in London, has evinced a distinct and loyal desire by India as a whole to remain "the brightest jewel in England's crown," and by the people generally to add to that brightness by efforts of their own. They merely ask for a greater share in the actual government and development of their realm than was granted them in former times. To this reasonable demand the British Imperial Government has wisely shown every disposition to give a favorable response, demanding on its part merely that it be permitted to exercise all due precaution to prevent such local government and development from being unwisely conceived or rashly administered.

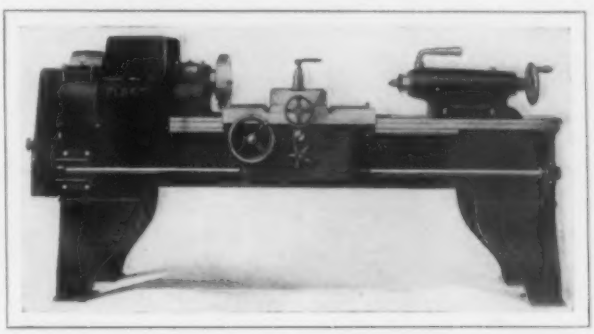
LACK OF SHIPS A SERIOUS OBSTACLE

There is, however, one very formidable obstacle in the way of Americans who know that there is a great opportunity for them in British India and wish to avail themselves thereof. This is the matter of marine transportation, the condition of which must continue to impede our foreign trade until an American merchant marine has been restored to the seas. If the development of British Indian railroads, industries, public utilities, and all the rest, together with the creating of a demand for what we now consider actual and very real necessities of advanced civilized life, and the supplying of the needs of India's three hundred millions when that demand is created, are to enter into our consideration, we must have satisfactory means of delivering the goods. As to the variety of that demand, one has but to think of the many different peoples, the religions, and the innumerable social standards of British India to realize something of the tremendously wide field—because India is undoubtedly the greatest such field in all the world. If the country is attractive in this commercial way to our manufacturers, contractors, and industrialists, it behooves them to take an active part in the movement for getting the American flag back on the ocean.

At the present time it would no doubt be possible for American manufacturers and exporters to gain a goodly share of India's import trade, even at the exorbitant freight rates ruling. But that is merely because all the European sources of supply are temporarily closed. This abnormal and deplorable state of affairs cannot last much longer in its violent aspect nor continue long after peace is restored. Then we shall find ourselves again unable to compete in any part of the world where cost prices are likely to be against us and freight rates almost surely unjust to us in their discrimination. Can we expect British or German or any other nation's shipping companies not to favor their own nationals as against us? To lower the cost of transportation and to secure favors with American ships, so that we may control the delivery vehicle, are manifest duties of manufacturers and all others who wish to increase shipments abroad. These essentials secured, the possibilities are immeasurable.

New Lathe of Standard Lathe & Tool Company

The Standard Lathe & Tool Company, 408 Euclid Arcade, Cleveland, Ohio, is placing on the market an 18-in. heavy pattern high-duty lathe designed for work on 3 to 8-in. shells. This is known as the Fleet lathe



An 18-In. Heavy-Duty Lathe for Machining Shells Ranging from 3 to 8 In. in Diameter

from the name of the designer. It is a heavy and powerful machine for rapid work in high-speed steel. It is built in any length from an 8-ft. bed up, increasing by 2-ft. lengths. The bed has one large V in front and one flat way in the rear for the carriage, thereby permitting the cross bridge of carriage to be made extra heavy. The apron of the carriage is made in a complete double wall or box section, giving all studs and shafts an outboard bearing. The feed and apron gears are of steel.

The New Ore Dock at Port Henry

For the 400,000 to 500,000 ton iron ore dock Witherbee, Sherman & Co., Inc., are to build at Port Henry, N. Y., as announced in THE IRON AGE of Jan. 6, Frank C. Roberts & Co., Philadelphia, have prepared the designs and the work will be under their supervision. The dock will be built in part on the site of the old Witherbee, Sherman & Co. dock, extending south toward the Cedar Point furnace. The first contract in connection with the construction work has been let to the New York State Dredging Company. The dock will be of steel and concrete, 1000 ft. long and probably 250 ft. wide. Ore will be accumulated in stockpiles and will be dumped direct from cars on a trestle into a concrete trough. The loading into barges will be by means of an electrically operated ore bridge of about 200 ft. span, carrying a clam shell bucket.

By the fall of this year it is expected the enlarged Champlain Canal, of which the Hudson River terminus is at Troy, will be completed. It will give a 12-ft. depth of water, permitting the operation of good-sized barges. The freight rate to New York Harbor from Port Henry on the completion of this canal is expected to be about 50c., as against $1.10 at present.

The profitable exploitation of the iron ores of northeastern Texas probably depends on the application of some scheme of mechanical concentration, according to Ernest F. Burchard in Bulletin 620-E of the U. S. Geological Survey. Analyses of 132 samples of brown ores from four counties show an iron content ranging from 44.50 to 55 per cent. As most of the so-called brown ores used in this country carry about 45 per cent iron, the great majority of the Texas ores are above the average.

American Institute of Mining Engineers

Iron and Steel Section Discussed Problems of Blast Furnace and Metallurgy of Steel and Cast Iron—A Formula for Tensile Strength

The iron and steel section of the American Institute of Mining Engineers has long held a commanding position as a forum for the presentation and discussion of important steel and metallurgical problems. The meeting in New York on Wednesday of last week, Feb. 16, was no exception. The program which took up a whole day embraced a variety of topics, but the attendance was not as large as the occasion warranted, and an absence of some prominent metallurgists and steel men who usually are important factors in the discussions was noted. There was also an unusual absence of the authors of the papers.

TWO BLAST-FURNACE PAPERS

Two important blast-furnace papers were presented, one on the "Measurement of the Temperature Drop in Blast-Furnace Hot-Blast Mains," by R. J. Wysor, chief chemist, Bethlehem Steel Company, South Bethlehem, Pa., and the other on the "Modern Development in the Combustion of Blast-Furnace Gas with Special Reference to the Bradshaw Gas Burner," by K. Huessner, president Huessner Engineering Company, Inc., Pittsburgh. The paper by Mr. Wysor was abstracted in THE IRON AGE, Oct. 14, 1915, and was presented in brief by the author at the meeting. Prof. J. W. Richards of Lehigh University, who occupied the chair, in opening the discussion called attention to the important principles for economies in practice contained in the paper. Dr. Leonard Waldo, consulting engineer of New York, raised the question as to the nature of the pyrometers that were used and whether the ends were exposed or protected and how standardized. Mr. Wysor replied that bare fire ends were used connected to Bristol pyrometers which are standardized in aluminum and sodium chloride. The range of temperatures involved were about 1700 and 1100 deg. Attempts to determine the temperature outside the stack, while not accurate, showed about 350 deg. Fahr. with no wind velocity, the inside running about 1300 to 1400 deg.

Lynn Bradley of the Research Corporation called attention to the effect of dust particles in the gases having a tendency to cause high temperature results which he considered to have been very nicely brought out by the author.

The paper by Mr. Huessner was also presented in abstract by the author. It gives a summary of the principles involved in the combustion of blast-furnace gas in boilers and stoves treated not so much from the standpoint of strictly scientific research as from that of the practical engineer. The author's conclusions were as follows:

> Boiler efficiencies depend on both efficient burners and good boiler "morals." If either of the two is lacking, high efficiency will generally be impossible. Boiler "morals" include proper conditions in the boiler plant itself, as well as intelligent working and close supervision. The regulation of a boiler plant should be done, as far as possible, exclusively on the dampers. With otherwise perfect conditions, efficiencies depend on the boiler loads. With a boiler load of 100 per cent an efficiency of 80 per cent is possible. With higher loads, it will soon drop to 75 per cent, but as a rule there will be no need to decrease the efficiency any further. Gas washing is profitable for stoves, but almost always results in losses where it is done for boilers. Moisture in the gas does not seriously affect efficiencies, except in the case of entrained moisture, which should be avoided. Where gas washing is resorted to, the most favorable temperature from the viewpoint of efficiency is 100 deg. Fahr. It is advisable regularly to draw up carbon balance sheets and keep a check of the results obtained by reducing them to pounds of steam per pound of coke.

In discussing the paper, Karl Nibecker, steam engineer, Youngstown Sheet & Tube Company, Youngstown, Ohio, gave his support to the contention of the author that a monthly figure giving pounds of steam per pound of coke is the one and only reliable method of measuring the economy or efficiency of a boiler plant and that such a method was the practice at his plant. Mr. Huessner stated that careful records at the Cambria Steel Company, Johnstown, Pa., showed that the number of pounds of steam per pound of coke varied but little when the furnaces themselves are erratic in their operation. Mr. Wysor, in commenting on the paper, said:

> At our plant we have had several Bradshaw burners under course of construction and erection for some time, but up to the present we have not had opportunity to put them in service. Mr. Huessner properly emphasizes the importance of obtaining the highest combustion temperature practicable in boiler practice, which demands a near approach to perfect combustion conditions.
>
> The question as to the relative value of hot raw gas and cold washed gas for boiler use is a very interesting one. I think that in the past the importance of low temperature of washed gas sometimes has been over-emphasized. The author has pointed out that so far as temperature is concerned, no advantage accrues in washing gas below 100 deg. Fahr. In many plants, there is a notable operating economy in using furnace cooling water, which is appreciably warmer than the supply water. However, in a given type of washer, other conditions being constant, the lower the exit gas temperature the lower will be the dust content.
>
> The method employed and extent of gas cleaning are clearly problems for individual furnace plants. As a general proposition, wet washing is decidedly more attractive for furnaces smelting soft, fine Lake ores than for those reducing chiefly hard, lumpy ores, such as the foreign and domestic magnetites. In the former case the average moisture content of the gas is probably 35 grains per cubic foot, the dust content is relatively high and the top temperature relatively low. In our plant the ore mixtures consist almost exclusively of hard magnetites. The average dust content of the gas leaving the dust catchers will average only about 2 gr. and the moisture about 12 gr. per cubic foot, corresponding to saturation at about 83 deg. Fahr. The temperature is fully 100 deg. Fahr. higher than in Western practice. Owing to the large percentage of gas consumed in gas engines and under boilers in our plant, gas economy is of prime importance. Clearly dry cleaning under such circumstances is an attractive issue.

ELECTRICAL DUST PRECIPITATION

With the possible exception of the Halberger-Beth system the only dry cleaning method of any promise at present for blast furnace gas is the Cottrell process. We installed a small experimental Cottrell electric dust precipitator at one of our furnaces over a year ago, but have had opportunity to begin tests only during the last few days. While we are not yet in a position to publish any results, we have obtained some that are promising, and are hopeful of the outcome. We have ultimately in mind the possibility of fine gas cleaning for gas engines, though at present aiming only for primary cleaning. I see no reason why this process, successful elsewhere, cannot be adapted to the peculiarities of blast furnace conditions. If successful the chief advantages which might be expected, in our case the maximum, would be as follows: First cost and operating cost should at least be no greater than with the present cheapest wet scrubbers, for equal dust elimination; conservation of about 10 B.t.u. of sensible heat per cubic foot gas; probably lower total moisture content; conservation of more flue dust for sintering, and elimination of undesirable sludge basins and sludge handling.

NAVAL ORDNANCE SPECIFICATIONS

The "Metallography of Steel of United States Naval Ordnance," by Harold E. Cooke, lieutenant commander, U. S. Navy, naval inspector of ordnance, Midvale Steel Works, Philadelphia, Pa., was discussed by title at the morning session but presented by the author at the afternoon session. It states the inspection require-

ments of the U. S. Navy Bureau of Ordnance and refers particularly to the fact that the bureau has furnished certain of its inspection offices with a portable Tassin outfit for the microscopic examination of steel. Since that time these offices have been studying the subject and making considerable progress in order to keep up with the development of the art so that when it reaches the state of development whereby it may be used to definite purpose in inspection, the various offices will be equipped and prepared.

The experience of the author in examining various grades of steel castings and forgings and his comments are interesting as well as the photomicrographs of some unusual structures. More detailed attention will be given to the paper in a subsequent issue of THE IRON AGE.

Prof. Albert Sauveur of Harvard University, in discussing the paper, stated that we all agree with Mr. Cooke that there is room for improvement in the annealing of steel castings and that it is probably impossible to render a casting, even after perfect annealing, equal to a forging. Still improvement is possible. It was surprising to him that any specifications should call for annealing only above the Ac_1 point when it should be above the Ac_3 point.

Professor Richards, in drawing attention to some provisions of the specifications calling for large cropping of ingots to eliminate slag and segregations, referred to the great advantage of the electric furnace in treating cold or hot metal so as to remove such impurities and lessen the crop and the great strides made in its adoption. Dr. Richard Moldenke said that these remarks were also applicable to gray iron castings so far as producing better castings and eliminating dirt.

Woolsey McA. Johnson's paper, entitled "A Chemical Explanation of the Effect of Oxygen in Strengthening Cast Iron," was presented only by title, nor was J. E. Johnson, Jr., owing to illness, present to discuss this interesting subject, which fact was a cause of regret. Professor Richards, however, called attention to a portion of the paper which he considered self-contradictory, as proving the opposite of what the author intended to prove; that is, in the two opposite and equal equations, V_1 would, in an excess of nitric acid, be increased, augmenting the solvent action and creating the opposite effect to the one desired.

THE CONTROL OF CHILL IN CAST IRON

G. M. Thrasher, chief chemist and metallurgist, Haskell & Barker Car Company, Michigan City, Ind., was not present to present his paper on "The Control of Chill in Cast Iron. Considering the Elements Effective in the Manufacture of Malleable Castings and Chilled Carwheels." An abstract was read by Dr. Richard Moldenke who emphasized several important points. He called attention to the author's statement that the principal disturbing influence on the tests was the fact that it is entirely possible to pour a mottled test and a gray test from the same ladle of iron depending on the pouring temperature, and that as to malleable iron produced with the same average chill but with varying analyses it will be found that the high-silicon, low-carbon mixture is more sound and reliable but possibly a little less fluid while the high-carbon, low-silicon mixture is subject to greater shrinkage and segregation which produce weakness. As to the effect of sulphur on the chill, even when present uncombined with manganese, the author regarded this point as having been greatly exaggerated and believed that oxygen occurring simultaneously will be found responsible for this exaggeration. The effects of manganese and sulphur must be considered together since it has been shown by several eminent investigators that, where present together in the proper ratio, they exist as MnS which, properly distributed, would be neutral and ineffective upon the chill or strength of the metal. In practical work it is found necessary to carry an excess of manganese above this ratio to insure reliable metal.

Dr. Moldenke called attention to the fact that there was no mention of the high sulphur in European malleable iron, as high as 0.40 per cent, and with not enough manganese present to take care of it. As to oxygen present as oxysulphides, he thought the development brought out was correct but that the credit given for this theory was wrong. He believed it possible to make good mealleable castings with either high-silicon, low-carbon or high-carbon, low-silicon iron, but that it was hard to apply these practically in all cases because of temperature variations.

Professor Sauveur deemed the paper a very instructive and satisfactory one, but he thought the author, in discussing the effect of sulphur on the chill, overlooked some recent views on this subject—that sulphur is present in iron sometimes in the cementite, promoting stability of the carbide and preventing its transformation into graphite, thus promoting the chill.

"Manganese Steel Castings in the Mining Industry," by Walter S. McKee, vice-president, American Manganese Steel Company, Chicago, Ill., was presented by title in the absence of the author as well as "Washed Metal" by Henry D. Hibbard and Edward L. Ford. Mr. McKee's paper was printed in part in THE IRON AGE, Dec. 9, 1915, while the Messrs. Hibbard and Ford's paper will be found in this issue of THE IRON AGE. Both papers passed without discussion, though Professor Richards, in speaking of Mr. McKee's paper, thought that the author overlooked the great usefulness of the electric furnace in melting ferromanganese and in making manganese steel castings while as to the subject of washed metal he said this paper brought the process up to date in the only plant in which it is made in this country.

Dr. Paul D. Merica, assistant physicist, U. S. Bureau of Standards, Washington, presented in abstract a paper by himself and H. Hanemann, entitled "Magnetic Studies of Mechanical Deformation in Certain Ferromagnetic Metals and Alloys," a paper regarded as highly important and presenting some revolutionary conclusions. The work was done in 1912 and 1913 at the Königliche Technische Hochschule in Charlottenburg, Berlin, and is a correlation of physical and mechanical properties particularly of steel. An adequate abstract will probably appear later in THE IRON AGE. The authors' résumé is here given:

> Simultaneous magnetic and mechanical measurements were made in the tensile-testing machine on a soft iron and other materials. These were made with a view to determining whether relations existed between the physical and the magnetic constants of such materials.
>
> It was found that the permeability of iron is independent of the previous elastic history of the material if (1) the alternations or cycles of stress have been within the elastic limit, and (2) the number of alternations has been small.
>
> It was found that there is a close and nearly linear relation between the elastic limit of soft iron and the values of the stress at which the permeability maxima occur, as the material is elongated.
>
> The magnetic indications and accompanying features of mechanical overstrain were studied.
>
> The conclusion is reached that the magnetic method is applicable to the study of the previous mechanical history of such annealed iron as was investigated, since indications are thus given of the values of the maximum stress to which it has been subjected, provided that this stress has been above the elastic limit. The permeability of this material is not affected by stress applications under the elastic limit.
>
> The effect of initial stresses upon the form of the induction-stress curves was noticed in the case of material as received, before annealing, and as heat treated by quenching in water.

J. H. Nead, metallurgical chemist, Belle City Malleable Iron Company, Racine, Wis., was not present to present his paper on "The Effect of Carbon on the Physical Properties of Heat-Treated Carbon Steel." An abstract was offered by G. E. Rausch of Lehigh University.

A FORMULA FOR TENSILE STRENGTH

Professor Sauveur, in discussing the paper, regarded it as an acceptable addition to literature on the subject and said that it showed definitely that steel in its pearlitic condition reached its maximum strength at its eutectoid point. A prevailing opinion that this was the case only when the carbon was 1 per cent was incorrect. However it is true that, when the steel is sorbitic, it probably reaches its maximum strength at 1 per cent of carbon or a little more. For pearlitic

steels Professor Sauveur offered a formula of his own for determining the tensile strength as follows:

$$T.S. = 45{,}000 + 84{,}000\ C\ (84{,}000 \times \%\ C)$$

in which the ferrite has a tensile strength of 45,000 lb. per square inch and the pearlite 115,000 lb. per square inch. Applying this to Mr. Nead's results he found that they corresponded well. This formula obtains only when the steel is thoroughly annealed.

Dr. John A. Mathews, president Halcomb Steel Company, Syracuse, N. Y., offered his experience as testifying to the accuracy of the statement that pearlitic steels reached their maximum tensile strength at the eutectoid point.

"Vacuum Fused Iron with Special Preference to the Effect of Silicon" was presented in abstract by W. E. Ruder, General Electric Company, in the absence of the author, T. D. Yensen, research assistant professor of electrical engineering, University of Illinois, Urbana, Ill. The summary and conclusions of the author were given in THE IRON AGE, Feb. 17, 1916, one of the principal points brought out being the remarkable magnetic properties of some of the alloys as well as the fact that the limit of forgeability lies between 7 and 8 per cent silicon and the critical range between 2.5 and 2.6 per cent silicon when the alloy is very brittle.

In opening the discussion Professor Richards emphasized the fact that this paper shows how metallurgical research touches the field of the electrical engineer. Dr. Mathews stated that at one time his company made some steel containing exactly 2.50 per cent silicon and about 0.25 per cent carbon which was not brittle but was easily forged and rolled; no manganese, sulphur or phosphorus were present. The steel worked as well as a 5 per cent silicon steel. Mr. Ruder said that never in commercial practice has any silicon steel under 5 per cent been obtained that was brittle. Possibly the presence of carbon was the explanation.

The remaining papers, "Iron Ores of California and Possibilities of Smelting," by C. Colcook Jones; "Manufacture and Tests of Silica Coke-Oven Brick," by Kenneth Seaver; "The Duplex Process of Steel Manufacture at the Maryland Steel Works," by F. F. Lines; "The Electric Furnace in the Foundry," by William G. Kranz; "Commercial Production of Sound Homogeneous Steel Ingots and Blooms," by Emil Gathmann, and "Suggestions Regarding the Determination of the Properties of Steel," by A. N. Mitinsky, were all presented at the fall meeting of the Institute in San Francisco. They were all brought up by title for discussion at the meeting last week, but none of the authors was present to present his paper. Mr. Lines' paper was given rather fully in THE IRON AGE, April 1, 1915; Mr. Kranz's paper in the issue of April 8, 1915; Mr. Gathmann's in that of Aug. 5, 1915, and an abstract of Mr. Mitinsky's in THE IRON AGE of Aug. 26, 1915.

SILICA COKE-OVEN BRICK

Only two of this group of papers elicited any discussion last week. After the presentation of Mr. Seaver's paper on silica coke-oven brick Professor Richards took the floor to state that a decided exception had been taken to a statement of his in San Francisco that the failure of the Bethlehem coke oven plant was due to unsuitable brick, and that it was his purpose here to register a general denial from the company in the form of a statement that:

"Refractory material did not affect the operation of the ovens."

W. H. Blauvelt, construction engineer, Semet-Solvay Company, Syracuse, N. Y., stated that modern coke-oven practice requires silica brick to-day whereas German practice does not; that the bricks used at Bethlehem would have been all right for German practice but that no American clay brick would stand present practice.

Professor Richards exhibited specimens of both clay and silica brick which had undergone decomposition, the clay having fused and the mortar of the silica bricks having run and disintegrated. By a diagram he showed that it is advisable to use a mortar between silica brick as low in aluminum as possible. Mr. Blauvelt suggested that the proper way to test a mortar was to spread it as a butter between the brick and subject it to the desired temperature and not test the mortar separately.

ELASTIC LIMIT AND FATIGUE

The presentation of Mr. Mitinsky's paper brought out some remarks on elastic limit and fatigue. Professor Sauveur said, in regard to the author's statement, that steel does not fail under fatigue unless the stresses exceed the elastic limit, that the question as to just what is the elastic limit is vital and values depend on the instruments. William Kent said the trouble about elastic limit was a very old one and offered a curve showing how it might vary in a piece of steel, while Dr. Waldo stated that the fatigue limit of a nickel steel with an elastic limit of 50,000 lb. per square inch differed decidedly from a chrome-vanadium steel of the same elastic limit.

NEW OFFICERS

At the business session on Tuesday morning, Feb. 15, L. D. Ricketts, Greene Consolidated Copper Company, 42 Broadway, New York, was elected president and a director, Karl Eilers and James MacNaughton, general manager, Calumet & Heckla Mines, Calumet, Mich., were elected vice-president and directors, while Thomas B. Stearns, Charles F. Rand, Charles W. Goodale, Edwin Ludlow and George D. Barron were designated as directors. Sidney J. Jennings, construction engineer, New York, was made first vice-president.

An innovation at this annual meeting was the publication by the committee on arrangements of a daily paper, *The Daily Fume*, which appeared on each of the four days of the meeting. With a motto "Accuracy Last," it was a source of much entertainment and no end of hits on some of the prominent members and officers in the Institute. The smoker at the Aldine Club on Tuesday evening was characterized by a number of very clever mineralogical and metallurgical take-offs before a large attendance.

On the last day of the convention, about 400 members and guests were taken through the Brooklyn Navy Yard. From there, by special arrangement with Secretary Daniels of the Navy, made by W. L. Saunders, the retiring president of the Institute, the Navy yacht Dolphin took the party to the army forts and proving grounds at Sandy Hook.

New York Air Brake Company's Year

The New York Air Brake Company reports its results of operations in the year ended Dec. 31, 1915, as follows, compared with the previous year:

	1915	1914
Sales	$4,731,529	$2,915,932
Manufacturing expenses	2,358,249	1,740,436
Factory profit	2,373,280	1,175,496
Other income	38,624	18,524
Total profits	2,411,904	1,194,020
Administration expenses, taxes, etc.	688,618	372,974
Net profits	1,723,286	821,046
Reserve for depreciation	200,000	.....
Balance	1,523,286	821,046
Bond interest	180,000	180,000
Dividends	599,544	599,544
Surplus	743,742	41,502
Previous surplus	273,012	231,510
Total surplus	$1,016,754	$273,012

A general safety meeting is to be held on Friday evening, Feb. 25, at Rumford Hall, 52 East Forty-first Street, New York City, by the New York Council of the National Safety Council. Addresses are to be made on accident prevention from the standpoint of the employee and of the employer. The latter subject is to be taken up by Dr. Francis D. Patterson, director of safety, Brill Car Works and the Harrison Bros. Company, Philadelphia. A motion picture play, "The House That Jack Built," prepared by Marcus A. Dow, general safety agent of the New York Central lines, is to be shown.

Gulf States Steel Company's Report

The Gulf States Steel Company, Birmingham, Ala., has issued a report under date of Jan. 1, 1916, giving details of results of operations in 1915. The balance sheet, as of Dec. 31, 1915, is as follows:

Assets

Works and property		$7,725,171.54
Cash		188,559.94
Accounts receivable		384,126.74
Notes receivable		269,413.19
Inventories		1,632,661.13
Prepaid taxes and insurance		5,135.99
Deferred charges		8,244.80
Total		$9,371,213.46

Liabilities

Preferred stock		$1,260,000.00
Second preferred stock		3,112,069.38
Common stock		3,284,307.98
Bonds Self-Fluxing Ore & Iron Company		286,000.00
Purchase money notes		56,889.85
Accounts payable		359,728.93
Accrued wages and other items		79,476.33
Dividend on first preferred stock, payable Feb. 15, 1916		191,100.00
Special reserves		48,874.65
Surplus, Dec. 31, 1914	$274,923.03	
Profit, 1915	608,943.31	
	$883,866.34	
Less dividend	191,100.00	
		692,766.34
Total		$9,371,213.46

From the accompanying statement by President James Bowron the following information is taken:

The company's operations are being conducted on a cash basis. The only notes outstanding are $12,000, representing deferred purchase money payments on coal lands purchased by our predecessors, and assumed by this company, and $44,889.85 for machinery and equipment, supplied on a basis at which the savings therefrom pay for the installments. During the year the outstanding bonds of the Self-Fluxing Ore Company, originally $289,000, have been reduced $3,000 by the operation of the sinking fund and will hereafter continue to be reduced at the rate of $1,000 per month.

Capital account expenditures to the amount of $256,972.29 have been made during the year, which are represented by additions of various kinds, at the steel plant at Alabama City, Ala., and at the company's coal mines. A steel and brick extension, 60 x 60 ft., of the barb wire department building, was made in which eighteen new 4-point barb wire machines were installed, while two fine nail machines were added in the nail department, a keg piling machine and two staple machines.

In addition to betterments and improvements, covered by the rehabilitation program, certain extraordinary repairs have been made, the cost of which has been charged to operating expenses. Advantage was taken of the fact that the blast furnace was out for relining, to put in new hearth, crucible, bosh and inwall, and to repair thoroughly all the foundations, making the furnace stack itself practically equal to new. These repairs cost about $70,000, all of which has been charged to operating account.

A church for the colored workmen at Alabama City and a school house and lodge room for the colored employees at the Virginia mines have been built at a cost of $2,820, and charged to operating expenses.

The completion of many of the improvements heretofore undertaken has done much to facilitate operations. The additional soaking pit permits the continuous operation of one more open-hearth furnace, thus adding practically 33 per cent to the ingot capacity, this being the limit of the blooming-mill capacity, single turn. The sixth open-hearth furnace is being completed and fitted up, as an additional safeguard against lost time during repairs, so that a spare furnace may always be ready.

The demand for 4-point wire for export purposes, particularly in the West Indies, has taxed the company's resources for some time, but by the addition of new machines this demand has been met and a satisfactory trade developed. Heretofore the galvanizing capacity has been inadequate to run both the barb wire and the fence departments full, but such capacity has recently been increased 50 per cent by installing a new unit, in consequence of which it will be possible hereafter to run both departments to their full capacity should conditions warrant.

The effect of the various improvements is to be seen in the tonnage produced, a comparative statement being as follows:

	1914, Tons	1915, Tons
Virginia Mines:		
Coal	170,915	248,578
Coke	72,295	138,211
Altoona Mine:		
Coal	112,158	119,816
Alabama City:		
Pig iron	52,150	82,382
Ingots	71,557	135,967
Billets and slabs	62,260	119,515
Wire rods	43,078	64,145
Wire, plain	47,945	57,950
Wire, galvanized	24,302	24,793
Wire, barb (painted)	.....	2,114
Wire, barb (galvanized)	11,222	13,471
Woven wire fence	11,195	8,960
Bars, plain	7,165	8,254
Bars, twisted	1,382	927
Tie plates	.....	987
Nails	20,478	24,058
Bale ties	578	516
Staples	1,331	1,552
Galvanized nails	115	122

The cost of pig iron has been heavily reduced in 1915 from the average cost of 1914, as the result of the better conditions of the company's plants and equipment, and of the use of by-product oven coke over a period of several months.

For the purpose of providing the necessary funds for the construction of a by-product oven plant and for proceeding with various other improvements which the company's increasing business renders daily more imperative, such as the equipment of the ore property, automatic stokers for the rod mill boilers, new machine and blacksmith shops, new warehouses for galvanized wire products, the directors have offered to the stockholders certain unsold treasury securities upon terms outlined in their circular letter of Dec. 24, 1915.

A conservative policy has been pursued in respect of sales, and the company's earnings have grown with the improvement in the open market. The business has progressed along lines of steady increase in the demand for its regular output in this country and in the development of its trade in the Southern republics, in Porto Rico, Cuba, India, China and Japan.

Germany's 1915 Pig-Iron Output

Germany's pig-iron production in 1915, according to the official figures of the German Association of Iron and Steel Producers, was 11,790,199 metric tons. This compares with 14,389,547 tons in 1914 and 19,309,172 tons in 1913. The decrease in 1915 from that of 1914 was 2,599,348 tons, or 18 per cent. The existing productive capacity is put at 20,000,000 tons annually, so that the present actual output is about 60 per cent of the total capacity. The output in the first five months of the war, August to December, 1914, was only 3,539,712 tons, which rose to 5,209,343 tons for the same months in 1915, or about 50 per cent. The production in the first 12 months of the war, ended July 31, 1915, was 10,121,552 tons.

The pig-iron output of Germany for December, 1915, was 1,029,144 metric tons which compares with 854,186 tons in December, 1914, and 1,019,122 in November, 1915. The daily rate of production was 33,198 tons which compares with the record daily war output of 34,720 tons in October, 1915, when the total was 1,076,343 tons, also the greatest monthly war output.

Italian imports of steel ingots and blooms for the first nine months of 1915 were 57,444 metric tons against 5878 tons in the same period of 1913. Total imports of iron and steel, including scrap, to Oct. 1, 1915, were 466,387 tons against 557,812 tons to Oct. 1, 1914, and 535,306 tons to Oct. 1, 1913.

The Imperial Munitions Board, of which J. W. Flavelle, Ottawa, Canada, is chairman, has accepted the process of sherardizing cast-iron nose plugs for shells as an alternative to nickel plating. Brass plugs are now being replaced with cast-iron ones.

ESTABLISHED 1855

THE IRON AGE

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Optimism Beyond Reason

Rather wide circulation has been given in the iron and steel and metal working trades in the past two or three weeks to a six-page circular with the title "A Few Reflections on the Conditions in the Iron and Steel Industry Affecting Not Alone the United States but the Peoples of the World." The source of the circular is not given, nor is the author's name, but he speaks of retiring from active business life after an experience of forty years and adds that his review of the situation is no attempt to create a temporary boom in the steel stocks. However, as he warms to the work of picturing what is ahead of the American steel industry, he observes, perhaps involuntarily, that in 1919 the various steel stocks will seem cheap at double present prices. From the number of inquiries THE IRON AGE has had concerning this anonymous deliverance, it has evidently appealed to the imagination of a certain number of manufacturers, though there has been no indication in Wall Street of any resulting stampede to buy iron and steel stocks. Apparently a good many readers of this boom deliverance want to believe it, and its delightful cock-sureness, following close upon the author's opening assurance that he "claims no prescience or superior judgment, but on the contrary has a strong realization of his own fallibility," completes their disarmament.

We shall not take space to traverse the ground covered by these six pages of "reflections." They are interesting, as is all speculation on what the steel industry will see after the war, and they go counter to all the pessimism or even the conservatism that has been found in the views heretofore expressed by some of our steel manufacturers. The electrical character of the predictions will appear from these paragraphs which the author has turned into headlines:

> The present world shortage of iron and its products is upward of 70 million tons.
>
> Fifty-five per cent of the world's productive capacity of iron and steel is embraced within the territory of the warring nations.
>
> The operation of the law of supply and demand will soon create a condition in this industry where the buyers, through competitive bidding, will establish a price level far higher than now prevailing.
>
> For two or more years after the ratification of a treaty of peace between the allied and the central powers, the imports of the present warring nations will largely exceed their exports.
>
> The annihilation of iron and steel through war alone is at the rate of 10 million tons annually.
>
> The productive capacity of the United States at its best cannot supply one-half the deficiency for the next three years.

Taking these six paragraphs in their order, some things are to be said about them:

1. The writer may mean that since the war started there has been, by reduction in iron output or by diversion of such output from ordinary uses to those of war, a loss to ordinary consuming channels of 70,000,000 tons. It is a wild guess. If he means a "world shortage" that must be made up later by extra buying, the statement is utterly misleading. Railroads in this country go for years on a reduced scale of buying without "making up." The whole country, in the years 1899-1902, did make up in a degree for its beggarly buying of iron in the depression beginning in 1893. But all such compensatory buying is made possible by long enforced economies, resulting in a new accumulation of capital which at length ventures out again. Europe is accumulating poverty.

2. The statement is approximately correct, but may signify much or little. Later the circular says: "England has placed an embargo on the shipment of iron, and practically every industry is employed in the manufacture of the munitions of war"; also that "the same is true to a greater degree in Germany." England is still exporting iron and steel at nearly 60 per cent of the average rate of recent years. Germany's iron industry is at two thirds its ordinary pace and besides war work is producing for the country's ordinary uses and for those of several neutral countries adjoining.

3. Something of this sort has happened in the United States. The circular appears to have been written in November, and there have been considerable price advances in steel products meanwhile, due to war demand.

4. A most improbable statement. With their crushing debts (already in Germany representing an interest and pension charge of $15 per capita on the present war debt alone) what will the warring nations have with which to settle an adverse balance of trade? They must export more than they

import. Their industries must work at top speed, and they must sell at any price obtainable so as to be able to pay for absolutely necessary imports and interest on war debts.

5. No data exist for any such estimates. Hundreds of vessels have been lost, and the armies are firing or wearing out hundreds of thousands of tons of iron and steel; but the guess might better be 5,000,000 tons. At all events it is not a "shortage" that must be "made up."

6. There may be no "deficiency" to be supplied. In case of an early peace, production is likely, for a year or two—since recovery in countries exhausted by war is slow—to be fully equal to all demand. If the war keeps up, England, Germany and the rest are likely to increase, as they are doing now, their production of war steel, and cut down the amount of high-priced material bought here.

The basic flaw in the reasoning of the anonymous writer is his failure to take proper account of the fearful depletion of Europe's resources in men and capital and the enormous reduction in its buying power, saying nothing of the possibilties of repudiation or of virtual confiscation to which capital in the warring countries may be liable, and the consequent blight upon enterprise throughout the world.

The Signs of a Great Ore Year

What has developed at Cleveland since plans began to be laid last November for this year's enormous movement of Lake Superior iron ore has caused more stir in the ore and vessel trades than they have seen since the season in the eighteen-nineties in which the Rockefeller fleet sprang into being almost over night. The heavy buying of vessels by ore shippers, the placing of contracts for more new freighters than the lake shipyards have taken on in years in one movement, the chartering of 10,000,000 tons of cargo room by the Steel Corporation for 1916, and the contracts the corporation and some other shippers have made with vessel owners for the next five years, on the basis of the going rate of each season—all indicate the great expectations entertained not only for the ore movement of this year but of the years just ahead.

We have referred to the estimate of some leaders in the trade that 60,000,000 tons of lake ores will be brought down this year. There are others who consider that 55,000,000 or 56,000,000 is a more reasonable expectation. It is granted that ore loading and unloading machinery is easily adequate for the handling of 60,000,000 tons of ore and more. But there is not the same certainty about vessel capacity, and there is doubt as to the perfect holding of every link in the chain that connects mine and furnace, through all the seven to seven and a half months of the shipping season. The unloading equipment at Lake Erie ports is probably equal to the handling of 50 to 100 per cent more ore than it has ever taken from vessels in a season; the limitation upon it is that it cannot be served steadily by sufficient cars and locomotives or by easily available dock space for fast stocking of ore.

Schedules made up at the head of the lakes point to total shipments of 60,000,000 tons this year, tentatively distributed as follows: Duluth, Missabe & Northern, 20,000,000 tons; Great Northern, 15,000,000 tons; Duluth & Iron Range, 10,000,000 tons; Soo Line (Cuyuna), 1,750,000 tons; Northern Pacific (Cuyuna), 250,000 tons. Here is a total of 47,000,000 tons. To this is added 13,000,000 tons for roads leading to Ashland, Marquette and Escanaba. If those are right who say that 56,000,000 tons is the limit of ore shipments under conditions that will exist in the coming season, some shortage of ore may develop if pig-iron production goes on through the year at the present rate. At two tons of ore to a ton of pig iron, and counting 80 per cent of the total to be Lake ore as in the recent past, a 39,000,000-ton pig-iron output would mean 62,000,000 tons of Lake ore. But furnace stoppages for relinings and repairs may make a 39,000,000-ton gait for a twelve-month impossible.

In all the remarkable developments of this unheard-of ore and vessel situation, two things are impressive. One is the faith in enormous ore shipments in years following 1916 shown by the heavy chartering for five-year terms and longer. The other is the rate of exhaustion of Mesaba mines that will result from a 60,000,000-ton scale of shipments. A list has been made of important mines on that range that will be exhausted by the close of this year. It includes no properties that have shipped less than 2,000,000 tons and one has produced 15,000,000 tons. The total number is 17, mostly underground, and their shipments will have totaled 65,000,000 tons by the end of 1916—but little more than the expected business of this year. The question naturally comes up, Where are the deposits of high-grade lake ores to take their place and keep up the 60,000,000-ton pace?

Free Trade Weakening

The European war will of course have important results aside from those expected when hostilities began. The belligerent nations each had an object which it was hoped might be accomplished by the arbitrament of war. Some of them may be successful in securing what they have desired, but others are certain to be disappointed. But developments that had not been foreseen may be almost as momentous as the checking of inordinate ambition, the rearrangement of territorial boundaries, or the creation of small autonomous states. Among these developments is the possibility of a change in the British fiscal policy. This is indicated by an overwhelming vote on Monday in the Manchester Chamber of Commerce against a declaration affirming the historic attitude of that body in favor of free trade. The announcement is made through British news channels that this is the first time the Chamber has declared against free trade since the death of Richard Cobden in 1865. While this action was undoubtedly taken because of antipathy to Germany, and in the expectation that at the close of the war German merchandise will not be given free entrance into British markets, which has been enjoyed for more than half a century, it is a noteworthy event from a broader viewpoint.

The departure of the British Government from its long-continued policy of free trade is evidently foreshadowed by this display of a change in sentiment in what has long been the citadel of free trade.

The Manchester school of political economy has withstood up to this time assaults of the most determined character from British interests injuriously affected by the invasion of their unprotected home markets. Statesmen of eminence, impressed by the spectacle of great British industries withering under the competition of foreign manufacturers, virtually invited to share in British markets by the absence of duties, have abjured free trade and endeavored to lead their fellow countrymen to support the imposition of moderate imposts. Up to this time, however, no argument has been sufficiently strong to shake the belief of the great body of the British people that the interests of the country were best promoted by keeping British ports open and the free entrance of foreign products untrammeled.

The judgment of world statesmen, as against that of doctrinaires, has long been growing more strongly opposed to free trade as an inflexible principle of a nation's fiscal policy. The progress of time, the developments of scientific and mechanical achievements and the growing political power of labor have wrought changes in the world's trade and in the equilibrium of the standing of nations that have thrown doubt on the propriety or even prudence of blindly adhering to either free trade or prohibitory protection. If an added force in penetrating a country's markets should present itself, as in the example of Germany with its government and its trade syndicates assisting and stimulating exports of manufactured products, yet with amply protective duties on corresponding imports, a manufacturing country with all its ports open for the free admission of merchandise would appear to be committing industrial suicide. Toward this end, in the opinion of all but the most fanatical free traders, Great Britain has been steadily moving for years. It has evidently needed this war to bring about a sufficient change of feeling throughout the country to enable those long opposed to free trade to receive a respectful hearing. If this should result in the abandonment of free trade as Great Britain's fixed fiscal policy, it would leave this country as the only important nation on the face of the globe inclining more toward free trade than toward protection. Yet even in the United States the European war would appear to be not without effect in swaying sentiment toward the imposition of duties perceived to be needed. Is this not demonstrated by the movement among majority leaders in Congress to place an adequate duty on dyestuffs?

Government Railroad Ownership

Although it will probably merely eventuate in the expenditure of much money with no practical outcome, the bill by Senator Newlands providing for an investigation of the subject of Government ownership of public utilities should be passed. The bill not only covers an inquiry into Government ownership of telegraph and telephone lines, express facilities and railroads engaged in interstate and foreign commerce but also opens up the whole question of Government regulation. The investigation is to be made by a committee composed of five senators and five representatives, selected from the Interstate Commerce committees of the Senate and the House. The question of the expediency of such ownership is continually being brought forward, frequently in the form of a threat by some Senator or Representative, and it would be well to have the matter thoroughly ventilated so that the people may possibly be able to judge for themselves whether or not such a scheme be feasible and, if so, advisable.

CORRESPONDENCE

Activity of German Electrical Works

To the Editor: My attention has been called to an apparent error in the title of the photograph showing women workers employed in one of the German electrical plants, as printed in THE IRON AGE, Jan. 27. Some months ago, in writing to a friend in Berlin, I remarked that the electrical industries must be greatly depressed. He answered that they had originally looked for this condition but that their fears had not been justified (Besorgnisse sind aber nicht gerechtfertigt), as an active demand then existed for electrical equipment of all kinds. He sent this photograph, with a number of others, to show the busy shops of one of the large companies.

What struck me as the most outstanding feature, however, was the number of women working by the side of men. I am now reliably informed that a view similar to this appeared in an album of photographs taken before the war. In that case it does not show any actual increase of women workers. Evidently my correspondent considered it a view typical of present activity, and I do not suppose any misrepresentation was intended; but the above explanation may be in order. May I ask you to publish something to this effect?

C. A. TUPPER.

Chicago, Feb. 17.

President Schwab on Profit Sharing

The New York *Times* of Feb. 17 prints the following:

In an address at a luncheon of the Aldine Club, yesterday, Charles M. Schwab said that brains were a bigger asset in business than money, and that he believed brains which resulted in profits to any company should share in the profits. "Brains are essential to the success of any business," Mr. Schwab said, "and should be paid for by those who make profit out of them. I am a believer in profit sharing with department heads, and I believe in profit sharing with workmen who, by their own efforts, increase the profits of a company by saving money for it or by increasing its production. If an assistant or an employee can add to the profits of a concern he should share in those profits."

Mr. Schwab told of the great growth of the steel industry in this country, and predicted that all records for steel production would be broken in 1916. He said that big business had eliminated small business in many fields, and had done so for the betterment of all concerned—capitalists, laboring men, and consumers.

After the luncheon, according to a report, Mr. Schwab told a few friends that last year he had paid Archibald Johnson, vice-president of the Bethlehem Steel Company, a bonus of $600,000 for his contribution of brains to the company, and that another official of the company had received a bonus of about $1,000,000.

The Henry Vogt Machine Company, Louisville, Ky., has filed an amendment to its charter by which the capital stock is doubled. The increase gives the company a capital of $1,000,000, all of the increase being cumulative preferred stock. The company states that no immediate expansion of the plant is completed and that the increase was provided to take care of the expanding business.

PIG IRON MAKERS MEET

Trade Commissioner Hurley Speaks on Conservation and Co-operation

The American Pig Iron Association held its second annual meeting at the Union Club, Cleveland, Ohio, on Friday, Feb. 18. About fifty representatives of pig iron producers were present. There were forenoon and afternoon sessions devoted to the discussion of questions relating to general business conditions, those in the pig iron trade in particular, and a banquet was held in the evening. Figures presented by the secretary, John A. Penton, showed that unfilled pig iron orders on the books of the merchant furnaces in the association, on Dec. 31, 1915, were 2,559,587 tons as against 1,178,484 tons on Dec. 31, 1914, or an increase of 1,381,103 tons. The stocks on hand at furnaces Dec. 31, 1915, were 499,122 tons as against 653,033 tons on Dec. 31, 1914, a decrease of 153,911 tons or 23 per cent. Southern furnaces are not represented in the association, nor at present are those of the Buffalo district which were in the association at the time it was formed two years ago. The member furnaces are located in what are known as the Chicago district, the Cleveland district, the Philadelphia district and the Virginia district. The association thus takes in most of the merchant furnaces in Minnesota, Wisconsin, Michigan, Illinois, Ohio, eastern Pennsylvania and Virginia. Some of the western Pennsylvania furnaces are also represented.

The order of Friday afternoon was an expression of views by the furnace owners present as to the general business outlook and the prospective demand for pig iron. The war and the effect of its long continuance as well as the estimated effect of its ending naturally figured prominently in the opinions given. The trend of sentiment was optimistic as to volume of business and profits. There was no disposition to overlook the fact that political and economic questions which were unsettled at the opening of the war and which vitally affect industrial conditions in the United States had not been disposed of but had simply been displaced by the remarkable business developments due to the war. At the same time there was the feeling that while the Presidential campaign would bring these issues into prominence the natural effect of such discussion upon business would be greatly modified by the continuance throughout the year of the heavy demand upon the country's iron and steel plants from both warring and non-belligerent nations. The belief was expressed that as price advances in the steel trade go farther their effect upon consumption at home will become more marked. The reduced consumption from this cause and the effect of possible labor troubles upon the country's production of iron and steel were two factors among influences toward conservatism which had considerable attention.

The present officers of the association were re-elected—Joseph G. Butler, Jr., president; F. B. Richards of M. A. Hanna & Co., Cleveland, treasurer, and John A. Penton, Cleveland, secretary.

ADDRESS BY TRADE COMMISSIONER HURLEY

At the dinner at the Union Club Friday evening the association had a number of guests, including the chief speaker of the occasion, Vice-Chairman E. N. Hurley of the Federal Trade Commission. Joseph G. Butler, Jr., presided. Mr. Hurley's address covered some phases of the work of his commission which he has touched on in similar addresses to manufacturers' and other organizations. [His address on "Net Incomes of Industrial Corporations," delivered in New York Dec. 1, was printed in THE IRON AGE of Dec. 9, page 1366.] He particularly emphasized the trust held by manufacturers having mining connections. The right development of these mineral resources and the working up and the marketing of products of which they are the foundation in a way that conserves values were enjoined as a responsibility not to be held lightly. "When the owners of our vast resources," said the speaker, "sell their products at ridiculously low prices —the lumber, the copper and coal that come from nature's storehouses—they are violating their trust, for the ruinous trade spells a waste that brings nothing in exchange." The evils of price-cutting by manufacturers who made prices without exact knowledge of their costs were held up, and one line of the Federal Trade Commission's activities, as has been indicated previously, is to encourage the establishment of better standards in cost finding. The data the commission is asking manufacturers to furnish, it was explained, will be used to further better business methods.

Mr. Hurley's address was received with appreciation and approval was given by later speakers who were called on by Mr. Butler. These were James H. Hoyt, who had been attorney for the Bessemer Pig Iron Association; Frank B. Baird, Buffalo-Union Furnace Company, who is president of the Buffalo Chamber of Commerce; Andrew Squire, Cleveland; Bascom Little, president of the Cleveland Chamber of Commerce, and W. H. Cottingham, president of the Sherwin-Williams Company, Cleveland.

A Cleveland daily paper, in an article on the pig iron meeting in its Saturday morning issue, said that the consensus of opinion of those in attendance was that the next six or eight months would see a great pig-iron shortage, and the startling headline statement was made that a "Pig Iron Famine, Due to War, May Put Price Way Up." Whether there was more than a coincidence in this publication and the increased number of inquiries for pig iron noticed at Cleveland on Saturday does not appear, but signs of renewed interest were generally reported in the trade.

Standard Cast Iron Pipe Company

The Standard Cast Iron Pipe & Foundry Company, Bristol, Pa., has issued the following statement for Dec. 31, 1915:

Assets

Real estate, buildings, machinery, tools and patent rights	$2,864,664.14
Capital stock, Bristol Realty Company	100,000.00
Accounts receivable	125,326.89
Bills receivable	571.17
Raw materials on hand	68,946.80
Merchandise on hand	106,345.33
Preferred capital stock in treasury	31,000.00
First mortgage 5% bonds in treasury	212,000.00
Second mortgage 6% bonds in treasury	250,000.00
Coll. trust 6% notes due Aug. 1, 1918, in treasury	2,000.00
Coll. trust 6% notes due Aug. 1, 1919, in treasury	50,000.00
Coll. trust 6% notes due Aug. 1, 1920, in treasury	50,000.00
Cash on hand	30,179.58
Total	$3,891,033.91

Liabilities

Common stock	$1,000,000.00
Preferred stock	977,000.00
First mortgage 5% bonds	925,000.00
Second mortgage 6% bonds	250,000.00
Collateral trust 6% notes due Aug. 1, 1918	100,000.00
Collateral trust 6% notes due Aug. 1, 1919	50,000.00
Collateral trust 6% notes due Aug. 1, 1920	50,000.00
Bills payable	295,250.00
Accounts payable	110,243.18
Profit and loss	133,540.73
Total	$3,891,033.91

The company's main office is at 112 North Broad Street, Philadelphia. Joseph S. Keen, Jr., is president; George M. Bunting, vice-president and treasurer; H. Bayard Hodge, secretary and assistant treasurer; William H. Roth, assistant secretary; W. E. Dodds, general manager.

German Steel Shipments in 1915

The shipments of the German Steel Works Union in 1915 were 3,246,124 metric tons, as compared with 4,734,557 tons in 1914 and 6,441,920 tons in 1912, the record year. The 1915 shipments were made up of 825,519 tons (1,915,501 tons in 1912) of semi-finished steel, 1,623,882 tons (2,879,742 tons in 1913) of railroad material and 796,723 tons (2,181,912 tons in 1912) of shapes.

The December shipments were 264,970 tons, which compares with 241,750 tons in November and 268,189 tons in December, 1914. The record monthly war shipments were 351,560 tons in March, 1915, with the lowest at 94,984 tons in August, 1914.

Bethlehem Acquires Pennsylvania Steel Co.

Bar, Tin Plate and Other Mills May Be Built at Sparrows Point—E. G. Grace President of Bethlehem Steel Corporation

Following closely the Midvale acquisition of the Cambria Steel Company and ending the seemingly interminable discussion concerning stock holdings in the Pennsylvania Steel Company and its ultimate status, came a formal announcement on Feb. 18 that the latter company had passed to the Bethlehem Steel Corporation. After a meeting of the Bethlehem Steel Corporation on that day, at which E. G. Grace, president of the Bethlehem Steel Company, was elected president of the corporation to succeed Charles M. Schwab, who had been both president and chairman of the board, the following statement concerning the Pennsylvania Steel Company purchase was made:

"The purchase price aggregates approximately $31,900,000, which is at the rate of par on the preferred and about $27 per share on the common stock of the Pennsylvania Steel Company. This amount is to be paid in 5 per cent 20-year purchase money bonds of the Bethlehem Steel Corporation, secured by mortgage upon the purchased property, with the reservation of bonds to retire underlying issues and to provide for improvements and additions.

"This acquisition is the outcome of the determination reached by the Bethlehem Steel Corporation some time ago to add to its output Bessemer steel products and other general steel lines, such as bridges, frogs and switches, girder rails, rail fittings, etc.

"For a number of reasons it seems that it would be better to accomplish these enlargements by acquiring the plant of the Pennsylvania Steel Company rather than to await the erection of additional plants at Bethlehem. The Pennsylvania Steel Company plants admirably supplement those at Bethlehem.

EUGENE G. GRACE
New President of the Bethlehem Steel Corporation

"The Sparrows Point plant gives to Bethlehem a plant at the seaboard which it has long desired for the development of its export trade. The purchase also brings favorable ore properties both in this country and in Cuba, and also important coal deposits."

The purchase price named above—approximately $31,900,000—represents $100 a share for the $20,587,500 of preferred stock of the Pennsylvania Steel Company, slightly under $27 a share for the $10,750,000 of common stock, and $8,500,000 to take up indebtedness of the Pennsylvania Steel Company to the Pennsylvania Railroad Company existing in the form of collateral trust bonds, and representing loans made for new construction work in recent years. The Pennsylvania Railroad and Reading Railway holdings in Pennsylvania Steel are paid for in the 5-per cent purchase money bonds referred to in the above statement. Other shareholders, including W. H. Donner, who had 38 per cent, will be paid in cash. In the negotiations of five months ago, in which both the Bethlehem Steel Company, on the one hand and W. H. Donner figured in turn as a possible purchaser of Pennsylvania Railroad and Reading Railway holdings in the steel company, the Bethlehem interests made it plain that there was a limit to what they would pay to acquire the Pennsylvania Steel Company. The fact that the latter and its subsidiaries were quite heavily in debt for their Cuban ore properties and for the improvements of recent years at Sparrows Point and Steelton made it obvious that whoever acquired the Pennsylvania Steel Company must reckon on providing an additional basis of credit for any further expenditures the properties might require. This a strong company like the Bethlehem Steel Corporation was able to do.

NEW LINES OF PRODUCT

Until the consummation of all the transfers involved in the Bethlehem acquisition, nothing is available as to the official changes that will result. The Bethlehem officers will visit the Steelton and Sparrows Point plants this week, partly with a view to determining what new construction will be advisable. For some time it has been known that the Bethlehem Steel Company had plans for the building of a Bessemer plant looking to the production of bars, tin plate and possibly wire. It is not unreasonable to expect that these plans will now be carried out, in part at least, at Sparrows Point, on which much of the export operations of the company will naturally center.

THE PROPERTY ACQUIRED

A total annual producing capacity of upward of 3,500,000 tons of ingots and a total of 17 blast furnaces represent in a broad way what the acquisition by the Bethlehem Steel Company of the Pennsylvania Steel Company's properties means. Both the Steelton and Sparrows Point plants have Bessemer converters and duplexing has been practised for some time. The Pennsylvania Steel Company has 7 blast furnaces, including two low-phosphorus stacks at Lebanon, the Maryland Steel Company 4 stacks and the Bethlehem Steel Company 6 stacks. The Pennsylvania and Maryland plants are each rated at 750,000 tons annual ingot capacity and the Bethlehem Steel Company's ingot capacity is generally put at 1,400,000 tons, with close to 600,000 tons capacity, part completed and part under construction with the turn of the year.

Besides a heavy addition to its steel rail capacity with the Maryland mill at tidewater, the Bethlehem has extended greatly its shipbuilding facilities, has acquired the important Mayari ore deposits of Cuba, has a 54 1/5 per cent interest in the Cornwall Ore Bank

Company, Cornwall, Pa., and now owns the Penn-Mary Coal Company, a property of 10,000 acres of coal lands in Indiana County, Pa., which produced 729,000 tons in 1912.

The shipyards of the Maryland Steel Company build vessels up to 600 ft. in length as well as floating dry docks and caissons for pier work and come now under the same control as those of the Union Iron Works Company, San Francisco; the Samuel L. Moore & Sons Corporation, Elizabethport, N. J.; the Harlan & Hollingsworth Corporation, Wilmington, Del., which also has a car-building plant, and the Fore River Shipbuilding Company, Quincy, Mass.

The Cuban iron ore properties, owned through the Spanish-American Iron Company, at Mayari, Nipe Bay, Cuba, consist of about 20,000 acres known as the Daiquiri mines, which produced 490,000 tons in 1913 and 52,000 acres, known as the Mayari mines, which produced 676,000 tons in 1913. With these nickel-chrome ores the Pennsylvania Steel Company has possessed a special product for castings and rolled products outside of the ordinary competitive field.

The Steelton rail facilities include girder rails for street railroad work and its structural rolling mills, with facilities for heavy sections, will add appreciably to the 480,000 tons capacity of the Bethlehem structural mills. Besides a remarkable bridge shop at Steelton, there is a large frog and switch shop, and the output includes also manganese and other steel castings and forgings.

THE PRESIDENT OF THE BETHLEHEM CORPORATION

The election of E. G. Grace as president of the Bethlehem Steel Corporation is recognition of the talent for constructive planning and for administration which have marked the rapid advance of the Bethlehem Steel Company in recent years. Mr. Grace started with the company in June, 1899, on his graduation from Lehigh University. He began in the electrical department, but in 1902, at the age of 26 years, he was appointed superintendent of yards. Four years later he was general superintendent, after four months as assistant. In 1908 he was elected a director and general manager of the company and in April, 1913, was elected president.

More Koppers Coke-Oven Contracts

The H. Koppers Company, First National Bank Building, Pittsburgh, has bought from the Newark Factory Sites, Inc., New York City, a tract of 35 acres located on the west side of the Hackensack River, near Jersey City, N. J. The company will build on this site, for the Seaboard By-Product Coke Company, 110 Koppers by-product ovens. There will also be a by-product plant and benzol recovery plant, coal and coke handling equipment, gas purifier, boiler plant, all necessary shops, office building, etc. The new plant will deliver gas to the Public Service Corporation of New Jersey, and will produce coke for blast-furnace, foundry and domestic users. Work will start at once, and the plant is expected to be completed early next year.

The H. Koppers Company has just received an order from the Inland Steel Company, Indiana Harbor, Ind., for 44 by-product coke ovens, which will make a total of 130 Koppers ovens at the plant. The Koppers ovens now under construction by the H. Koppers Company include 212 for the Lehigh Coke Company, South Bethlehem, Pa., 94 for the La Belle Iron Works, Steubenville, Ohio, 94 for the Toledo Furnace Company, Toledo, Ohio, 204 for the Youngstown Sheet & Tube Company, Youngstown, Ohio, the same number for the River Furnace Company, Cleveland, Ohio, 47 for the United Furnace Company, Canton, Ohio, 84 for the Brier Hill Steel Company, Youngstown, Ohio, 37 for the Gulf States Steel Company, Gadsden, Ala., and the 44 for the Inland Steel Company above mentioned.

The second of the two 500-ton blast furnaces of the Minnesota Steel Company, Duluth, was blown in last Friday.

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Customs Decisions

STEEL BLOOMS AND STEEL STRIPS

The Board of United States General Appraisers, in a test case brought by Edgar T. Ward's Sons, Boston, has construed the provisions of the tariff act of 1913, as they apply to the classification of steel blooms and steel strips. The customs officials levied duty on the former at the rate of 8 per cent under paragraph 110, as Bessemer bar steel, and on the latter at 15 per cent under the same paragraph as steel made by the crucible process and finished by rolling. The protestants claimed free entry under paragraph 613, which specifically enumerates "blooms," while the steel strips were alleged to be dutiable at 12 per cent under paragraph 105. A good deal of testimony was taken from which it appeared that the blooms were made by the Bessemer process and that they did not contain any of the alloys mentioned in paragraph 613; that steel bars were made from blooms by either hammering or rolling; that while the particular articles under consideration were probably in the form of square blooms before they were hammered partially into the shape of bars as imported, they were nevertheless still commercially known and dealt in as blooms, not having been hammered sufficiently to transform them into bars.

Another point emphasized by the importers in their testimony was that the blooms in controversy differed from bars in that the former had not the regular and uniform surface dimensions throughout their entire lengths which must always be present in the latter before they are known and recognized through the trade and commerce of this country as bars; that this difference in the condition of the two classes of articles was the determining factor by which blooms and bars were distinguished by such trade, and finally, that the commercial understanding as to what constituted a bloom in no way differed from the common and ordinary meaning thereof. Judge Fischer said, in his decision written for the board, that it had been shown conclusively by the importers that the merchandise was "blooms" and not bars, and had been specifically provided for in paragraph 613 of the free list as claimed. The collector was reversed. The custom house classification of the steel strips was also upset by the board, it being held that such strips, when measuring more than 5 in. in width, were not specifically provided for in the tariff, and were accordingly relegated to the general provision for "strips of iron or steel not specially provided for" in paragraph 105.

WIRE-DRAWING MACHINES

The Stone & Downer Company, Boston, was successful before the board in a controversy dealing with the classification under the present act of merchandise consisting of wire-drawing machines assessed for duty at 20 per cent as manufactures of metal not specially provided for. Entry was claimed at 15 per cent as "machines," under paragraph 165. The method of operating the wire-drawing machines was described at length by a witness for the importers and involved the use of dies. The board stated in its decision that it was satisfied that the dies as here employed are to all intents and purposes tools which operate upon metal, and that the machines being driven by other than hand power fell properly within the Congressional definition of "machine tools" as set forth in paragraph 165. It was therefore directed that the wire-drawing machines be admitted at 15 per cent as claimed.

MODEL OF INVENTION

Much testimony regarding what constitutes a "model of invention," as that term is used in the tariff act of 1913, was given in a test case brought before the board by Oil Well Supply Company, Pittsburgh. The merchandise consisted of certain metal gages, described on the pro forma invoices as "boring material models." They were classified by the collector as manufactures of metal not specially provided for, duty being at 20 per cent. Counsel for the company went before the board with the claim that the articles fell under paragraph 551 of the free list reading "models of inventions and other improvements in the arts, to be used exclusively as models and incapable of any other use." No samples of the merchandise were put in evidence, but Judge Fischer said in his decision that the testimony introduced in behalf of the importer was sufficient to enable the board to determine the proper classification.

It was brought out at the hearings that the imported gages were returned abroad after copies or duplicates thereof had been made by the importer, and that in the making of such copies or duplicates it is necessary to test the latter for accuracy of the threads by screwing into them the imported gages. To that extent, at least, the imported gages were shown to have a practical use other than as models. The gages were composed of the same metal, and the threads cut in them were precisely of the size as those which were cut into the drilling tools and the extension parts thereof manufactured by the Oil Well Supply Company for use in drilling oil wells. In fact, at each of the joints, in order to secure accuracy and uniformity in the threads, they were tested by having the imported gage screwed into them.

In this connection, a witness for the importer testified that the article served the purpose of a "working gage." In view of this testimony, the board held that the gages were clearly not of the class of models contemplated by paragraph 551. Following the principle laid down in an earlier case, it was ruled that the models contemplated by the legislative mind in the last revision of the tariff were undoubtedly those that had for many years been regarded by the Treasury Department as limited to such merchandise as miniature examples that cannot be used for any other purpose than to illustrate the articles of which they are claimed to be models. The protest was overruled and the collector affirmed.

Future Methods in Metallurgical Research

In the recent address of Professor LeChatelier to the old students of the Paris School of Mines, Paris, France, he touched upon the future of metallography. He said that at first chemical analysis had given much useful information and had been the starting point of modern metallurgy. Microscopic metallography had continued in the same path by defining the conditions of the variations of the properties of each alloy, thus permitting the regularization of a large number of manufacturing processes. But these two sciences were not yet sufficient by themselves to solve all the problems presented by the study of metals and alloys and several elementary factors escaped these two methods of observation.

The thermo-dynamic stability of bodies was generally admitted, he said, and it was supposed that a body of given composition and chemical constitution, with a definite form and structure, at a given temperature, pressure, and electro-motive force, had all its other properties, especially its internal energy, rigorously fixed. That supposition was in reality no more than a first approximation, for one might add to or take from the energy of a body without varying the conditions enumerated above. Very probably most radio-active bodies were ordinary elements charged with a little energy, like phosphorescent calcium sulphate. The advance to be made to-day was to find the means of defining and measuring these new elementary factors. That would involve, in the case of metals, the study of the magnetic properties, the hardness, and other properties by methods not yet suspected.

The car and locomotive shops of the Chicago, Milwaukee & St. Paul Railway Company at West Milwaukee, Wis., are now employing between 6000 and 7000 workmen, being the largest number on the payroll in more than two years. In that time, also, the company has increased days of work and hours of work so that all men now employed are working full time six days a week. According to A. E. Manchester, superintendent of motive power, in charge of the shops, the capacity force is somewhat greater than the present payroll, but conditions at this time are declared to be the best since the late summer of 1912.

$465,000,000 IN AUTOMOBILES

Value of the 573,114 Machines Produced in the United States in 1914

WASHINGTON, D. C., Feb. 22, 1916.—Nearly half a billion dollars' worth of automobiles were produced during 1914, the year covered by the quinquennial census of manufactures now being compiled. This huge total was three and a half times the value of the product of this industry as returned by the census of 1909.

The official statistics show that during 1914 there were in the United States 338 establishments manufacturing complete automobiles, their output being 573,114 machines, valued at $465,042,474. Thirty-eight of these establishments were engaged primarily in the manufacture of bodies and parts, agricultural implements, and other products, and reported the manufacture of complete automobiles as a subsidiary product. In addition there were 12 establishments which manufactured 20 cars, either for experimental purposes or for their own use, upon which no market value could be placed.

At the 1909 census 315 establishments were reported as engaged in the manufacture of automobiles either as a primary or as a subsidiary product; and their output was 127,287 machines, valued at $165,099,404. During the five years 1909-1914 there has thus been an increase of 350.3 per cent in the number of automobiles manufactured, and 181.7 per cent in their total value. The fact that the increase in value of output during the five years was relatively much smaller than the increase in number of machines made is accounted for not only by a general reduction in prices, but also by the production of a larger proportion of machines of low-priced makes in the later year as compared with the earlier.

Of the total number of automobiles manufactured in 1914, those operated by gasoline or steam power numbered 568,399, and those operated by electric power, 4715, as compared with 123,452 operated by gasoline or steam, and 3835 by electric power, manufactured in 1909. The increase during the five years in the number of gasoline and steam machines manufactured was thus 360.4 per cent, and in the number of electrics, 22.9 per cent.

Touring cars formed the principal type manufactured in both census years. In 1914 the output of this class of machines was 454,876, valued at $351,585,518, compared with 76,189, valued at $113,510,575, in 1909. Of the total production for 1914 the number designed for pleasure or family use was 544,255, compared with 119,190 in 1909. For business purposes and for use as public cabs, omnibuses, ambulances, patrol wagons, fire-fighting machines, and for other business purposes, 24,144 machines were manufactured in 1914, compared with 4262 in 1909. The output of delivery wagons and trucks was 22,753 in 1914, compared with 2771 in 1909.

The report also classifies the gasoline and steam automobiles manufactured in 1914 according to their horsepower. The production of vehicles of less than 10 hp. amounted to only 391; of from 10 to 19 hp., to 45,116; of from 20 to 29 hp. to 346,399; of from 30 to 49 hp., to 163,468; and of 50 hp. or more, to 13,025.

Comparative Summary of Number of Automobiles Manufactured, as Reported for the Censuses of 1914 *and* 1909

	1914	1909	Per Cent of Increase, 1909-1914
Total	573,114	127,287	350.3
Gasoline and steam*	568,399	123,452	360.4
Family and pleasure	544,255	119,190	356.6
Touring cars	454,876	76,189	497.0
Delivery wagons and trucks	22,753	2,771	721.1
All other	1,391	1,491	†6.7
Electric	4,715	3,835	22.9

*Returns were received from only two establishments making steam automobiles in 1914. The statistics for these companies are consolidated with those manufacturing gasoline automobiles in order to avoid the disclosure of their operations.

†Decrease.

The figures given in this report do not represent the number of establishments nor the value of products of the entire automobile industry, but only the figures for establishments making complete automobiles. In addition to these establishments, a large number are engaged in the manufacture of automobile parts and accessories. The value of automobile tires made by establishments in the rubber industry is very large, and many of these tires as well as other parts and accessories are sold to repair shops and automobile owners, and therefore do not appear in the value of products of the automobile industry. W. L. C.

The Chicago Cement Show

The visible manifestations of the industry built around concrete, as presented at the ninth Chicago Cement Show, held at the Coliseum in that city Feb. 12 to 19, reveal in an astonishing degree the large and varied use of steel and iron which this industry has occasioned. Machinery for the manufacture of the cement; mixing, conveying and handling equipment for the contractor; steel bars and wire in many forms for reinforcing; steel forms for monolithic construction, and cast-iron molding machinery for concrete blocks, all these, together with the power machinery for driving this equipment, represent a consumption of ferrous metal which has grown at a rate commensurate with the exceptional growth of the Portland cement business. What the promotion of the use of concrete is doing, as visualized at the show, in adding to the market for pig iron, steel and iron bars, sheets, plates, structural shapes, wire, bolts, rivets and chain, may well dispel the fears that have been entertained regarding the inroads that reinforced concrete construction is likely to make on the consumption of steel. The exhibition has added emphasis to the suggestion made by Edward M. Hagar, before the American Iron and Steel Institute a year ago, that steel and cement manufacturers may well co-operate in the extension of markets for their products.

Steel Corporation's Large Purchase of Bonds

J. P. Morgan & Co. announced last week that they had sold to the United States Steel Corporation for account of the British Treasury $22,800,000 of the corporation's first collateral trust 5 per cent sinking fund gold bonds, due 1950. This block of bonds was previously held by the Carnegie Foundation Funds of Scotland and was sold by the trustee of the funds about three months ago to the British Government in furthering the plan of mobilizing American securities for sale back to this country. It is understood that the block will be added to others held in the sinking fund, there to be kept alive. The interest paid on them will work to build up the fund available for the purchase of more bonds. The amount now devoted annually to purchases of this class of bonds is approximately $5,200,000. They are callable at 115 and interest and the current quotation is 112 bid and 114 asked.

The Ashland Iron & Mining Company, Ashland, Ky., has purchased the Ashland sheet mill, to serve as an adjunct to the open-hearth steel plant which the company has arranged to build. The sheet mill, sold at a commissioner's sale, had been appraised at $100,000 but was purchased for $67,000. It was erected by the McCullough Brothers of Niles, Ohio, 15 years ago and was in operation until eight months ago.

An elaborate exhibition of canning machinery was set up, some of it in operation, at the Armory, Louisville, Ky., during the week ended Feb. 12, in connection with the convention of the National Canners' Association and allied industries. Most of the leading manufacturers were represented.

The nickel ore output of New Caledonia in 1914 was 172,365 tons compared with 164,404 tons in 1913.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

TEST OF MACHINERY BOUGHT ON APPROVAL.—When machinery is sold on condition that it shall be tried by the buyer for a stated period and that if it proves unsatisfactory it may be returned, the purchaser must subject the machinery to actual test and will not be justified in rejecting it on the ground that other purchasers found the same kind of machinery unsatisfactory. (Kentucky Court of Appeals, Bayer Steam Soot Blower Company vs. Louisville Trust Company, 179 Southwestern Reporter, 1034.)

WAIVER OF WARRANTY OF CAPACITY OF MACHINE.—Where a machine was sold on condition that it might be returned if found to be unsatisfactory after 10 days' trial the buyer's retention of it beyond that period without objection waived any right to reject the machine on the ground that it did not possess the capacity the seller warranted it to have. (Texas Court of Civil Appeals, Seng vs. Braden-Zander Construction Company, 179 Southwestern Reporter, 1103.)

BREACH OF WARRANTY OF FACTORY MACHINERY.—When a buyer of machinery installed in a factory claims damages for delay in operation of the plant, due to defects in the machinery warranted against by the seller, and it appears that there were different causes for delay, the burden is on the buyer to clearly show what part of the delay was caused by the breach of warranty complained of. Even when a machine bought constitutes an essential unit upon which operation of the whole factory depends, and it is discovered to be deficient, the buyer cannot retain the machine without substitution of another for an unreasonable length of time and then recover the daily loss resulting in operating the defective machine. He will be limited to recovery of the excess of the value of the machine as it was represented to be above its actual value. (Ohio Supreme Court, Lewistown Foundry & Machine Company vs. Hartford Tone Company, 110 Northeastern Reporter, 515.)

REPAIR OF PATENTED MACHINES.—It is not contributory infringement of a patent for one to furnish to the owner and user of a patented machine repairs for the machine, unless that amounts to a virtual reconstruction of the machine, or unless there is an express limitation of the right to repair contained in the contract under which the machine was sold by the patentee. The purchaser of a patented machine is legally entitled to make necessary repairs and replace worn-out parts, not separately patented, so long as the identity of the licensed machine is not destroyed. (United States District Court, District of Delaware, F. F. Slocomb & Co. vs. A. C. Layman Machine Company, 227 Federal Reporter, 94.)

EFFECT OF WRITTEN CONTRACT OF SALE.—Where after oral or written negotiations a contract of sale of machinery is reduced to the form of a complete contract in a letter or formal agreement, the buyer is not entitled to rely upon a warranty comprehended by the preliminary negotiations but not included in the final contract. A written contract merges not only prior oral negotiations, but also prior written negotiations. (South Carolina Supreme Court, Smith & Furbush Machine Company vs. Johnston, 86 Southeastern Reporter, 489.)

WAIVER OF DEFECTS IN LIEN STATEMENT.—Where the purchaser of machinery for a blast-furnace plant, after the filing of a mechanic's lien claim by the seller, agreed that proceedings for enforcement of the lien might be postponed three years, any defects in the claim were waived and there was an implied admission of the sufficiency of the lien for the purposes of enforcement. (Pennsylvania Supreme Court, Mesta Machine Company vs. Dunbar Furnace Company, 95 Atlantic Reporter, 585.)

LIABILITY ON SALE PRICE NOTES.—One who has given notes for the price of machinery bought is not entitled to defeat liability on them on the theory of a rescission by him because of default on the part of the seller, unless it appears that return of the machinery was tendered to the seller. (New York Supreme Court, Appellate Division, Smith vs. Hedges, 155 New York Supplement, 934.)

LIENS FOR MATERIAL FOR PUBLIC BUILDINGS.—An iron works company furnishing material for the construction or improvement of a Texas school or other public building is not entitled to enforce a materialman's lien to secure payment. (Texas Court of Civil Appeals, Oil City Iron Works vs. Rice Common School District, 180 Southwestern Reporter, 112.)

SKILL REQUIRED OF MECHANICAL ENGINEERS.—A person who contracts to design mechanical equipment for a building impliedly warrants that he possesses sufficient skill and capacity to do the work reasonably well. (Washington Supreme Court, Moore vs. Saunders, 153 Pacific Reporter, 329.)

REMEDY OF SELLER ON BUYER'S DEFAULT.—When a buyer has repudiated a contract to purchase articles specially manufactured for him, and the seller has elected to retain them subject to the purchaser's order, on destruction of the articles by fire not attributable to the seller's negligence he is entitled to recover the full contract price. (Michigan Supreme Court, Hydrex Silent Exhaust Works vs. Seager Engine Works, 153 Northwestern Reporter, 432.)

DAMAGES FOR FAILURE TO DELIVER STRUCTURAL STEEL.—On failure of a seller of structural steel to deliver quantities called for by a contract, the buyer is entitled to recover the excess of the market price at the time and place agreed upon for delivery above the agreed price, it being the legal duty of the buyer to make diligent effort to purchase his requirements elsewhere at the lowest possible price, thus minimizing the damages resulting to him from the breach. (Michigan Supreme Court, Sauer vs. McClintic-Marshall Company, 155 Northwestern Reporter, 586.)

LIABILITY FOR NEGLIGENCE OF CO-EMPLOYEE.—In a suit against an employer for injury resulting from plaintiff's co-employee negligently causing molten metal to fall from a ladle upon plaintiff's foot, it is decided that, if an employee believes another employee to be incompetent, and he complains of the fact to the employer, and the employer gives assurance that there is no danger, and the employee, relying upon this assurance, continues in his work, and is injured by reason of the incompetency of the other employee, the employer is liable, unless the danger of continuing in the work with the incompetent assistant was so obvious that an ordinary prudent person would not have continued to work, even though such assurance was given. (Kentucky Court of Appeals, Cherry vs. Lack Singletree Company, 179 Southwestern Reporter, 1071.)

RESPONSIBILITY FOR INJURY TO VOLUNTEER.—Plaintiff who voluntarily assisted in fighting a fire at defendant's plant, without any contract of employment, is not entitled to recover for injury sustained on the breaking of a ladder upon which he was standing. (Michigan Supreme Court, Smedley vs. Mashek Chemical & Iron Company, 155 Northwestern Reporter, 357.)

DELAY IN DELIVERING MANUFACTURED ARTICLES.—The fact that a buyer of machinery parts has accepted delivery does not preclude his making counterclaim against the price for damages resulting from an unreasonable delay on the part of the seller in making delivery. Within the rule that when no time for delivery of goods sold is agreed upon, delivery must be made within a reasonable time, the seller is not entitled to excuse delay on motives of economy or convenience to himself. (New York Supreme Court, Appellate Division, Sturges & Burns Mfg. Company vs. American Separator Company, 156 New York Supplement, 872.)

IOWA CONDITIONAL SALE CONTRACTS.—The Iowa statute which makes unrecorded conditional sale contracts invalid as against purchasers from, and creditors of, the buyer without notice of the retained title, applies to a contract which is substantially one for conditional sale of machinery, although, in form, a lease of the machinery subject to the lessee's right to a bill of sale on payment of certain installments. (Iowa Supreme Court, Handlan-Buck Mfg. Company vs. Waterloo Drop Forge Company, 155 Northwestern Reporter, 802.)

REVENUE LEGISLATION

Measures to Provide More National Revenue—Protective Duty on Dyestuffs

WASHINGTON, D. C., Feb. 21, 1916.—Plans for comprehensive revenue legislation have just been completed by the Congressional leaders. It is now the best opinion here that by May 1 a measure will be placed on the statute books providing for sufficient additional revenue to meet the current deficit in the Treasury and to supply the money needed for the Administration's national defense program, authorizing the appointment of a non-partisan tariff commission, granting protection to the American dyestuff industry and preventing the dumping on our markets of the surplus products of foreign manufacturers. It is estimated that sufficient revenue will be raised to permit the repeal of the stamp taxes embraced in schedules A and B of the emergency war revenue act, the repeal to take effect July 1. The House in a few days will pass a joint resolution restoring sugar to the dutiable list, thereby saving at least $45,000,000 per annum which would have been lost to the revenues under the operation of the free sugar clause of the Underwood-Simmons tariff law.

The original plan of the leaders involved separate bills for raising revenue, creating a tariff commission, protecting the dyestuff industry and barring the dumping of foreign products, but a careful canvass of both houses of Congress has demonstrated that a general measure embracing all these subjects will be much stronger than a series of individual bills, and unquestionably can be disposed of in much less time. A composite bill will therefore be reported by the Ways and Means Committee, probably within the next 30 days, and put through the House after three or four days' debate. The Senate Finance Committee will report the bill promptly.

The general revenue bill will provide from $150,000,000 to $175,000,000, the exact amount depending upon the aggregate of the sums carried by the army, navy and fortifications bills. The repeal of the stamp taxes will cut off about $34,000,000, but this sum is included in the estimated total of the revenue bill. The increased revenue is to be derived from higher taxes on incomes, a federal inheritance tax, higher taxes on distilled spirits and beer and a tax on war material. Tobacco may also be called upon to stand a higher internal revenue impost. President Wilson's entire project, involving taxes on gasoline, internal combustion engines, automobiles, pig iron and "fabricated" iron and steel, has been thrown overboard by the Ways and Means Committee.

The general lines of the Rainey bill creating a tariff commission will be followed in the composite measure, but the Bureau of Foreign and Domestic Commerce is at work on certain administrative features designed to give the commission ample authority to make all investigations necessary as a basis for tariff legislation. The President will be authorized to designate the chairman of the commission and there is a well-defined rumor here that he has already selected Secretary of Commerce Redfield for this important post. If the general revenue bill becomes a law by May 1 this commission will be able to organize as early as July 1 and would be in position to make recommendations to Congress for legislation next winter. It is more than likely, however, that, whether the Democrats or Republicans are successful in the Presidential elections next November, tariff legislation will be deferred until a special session which may be called in the spring of 1917.

Sentiment regarding an anti-dumping clause has ranged from the countervailing duty plan of the Canadian law to Secretary Redfield's project for treating dumping as a form of "unfair competition" amenable to the Federal Trade Commission. Chairman Kitchin, of the Ways and Means Committee, is now holding a series of conferences with Congressional and Administration leaders as to the form of this legislation and the evident earnestness of prominent members of the Ways and Means Committee in demanding a thoroughly practicable statute encourages the hope that the legislation will be modeled on the Canadian law, which has proved so satisfactory.

Notwithstanding the prejudices of the majority of the members of the Ways and Means Committee against a protective tariff, all indications now point toward legislation providing higher duties on imported dyestuffs. The projectors of the new dyestuff factories are receiving a great deal of assistance from consumers, notably in the cotton and woolen trades, who heretofore have objected to higher tariffs on dyes because of the increased cost that would be involved. The recent shutting off of the German supply has now convinced these consumers that it is better to pay a little more for dyes and be assured that their wants will be provided for under all conditions than to risk a repetition of the experiences of the past six months. A reasonable increase in the protection afforded to American dyestuff producers will have a decided effect in sustaining the value, after the war, of benzol which has become so important a by-product of coke manufacture. The chief consideration that has induced the Congressional leaders to look with favor on the proposition to raise the tariff on dyestuffs has been the fact that in time of war the domestic plants, with very little change in equipment, could be used for the production of explosives, for which benzol is a raw material of much importance. W. L. C.

Permanent Machinery Exhibit Planned

Announcement has been made of a plan to establish a permanent exhibition of machinery on the fifth floor of the Grand Central Palace, New York, several floors of which are now occupied by the New York Furniture Exchange. The promoters say that the Furniture Exchange, in its 20 years of life, has demonstrated the value of grouping display and sales rooms, and that a similar permanent exhibition of machinery should have been established in New York long ago, as was done at the Bourse in Philadelphia. It is proposed to call the new enterprise Machinery Hall, and to house mechanical equipment of all kinds.

The announcement states that it is proposed to subdivide space to suit exhibitors in an area of 55,000 sq. ft., which is abundantly lighted. Exhibitors may have their offices there, with electric lighting and other facilities, including a force to care for exhibitors' spaces in their absence, hand out literature and otherwise, so far as may be practicable, represent them. It is asserted that the project will be a step forward in securing export trade. The Grand Central Palace is a part of the new terminal plan of the New York Central Railroad. H. D. Benedict, Merchants & Manufacturers Exchange of New York, Grand Central Palace, is the manager of the project.

Ferromanganese Imports from Great Britain

British exports of ferromanganese, spiegeleisen and ferrosilicon in 1915 are officially reported at 103,077 gross tons, but probably most of this was ferromanganese. In 1914 these exports were 111,788 tons and in 1913 they were 178,919 tons. Of the 103,000 tons exported in 1915, the United States received only 55,201 tons, showing that considerable quantities went to other countries. The amount reaching this country in the past three years and that exported by Great Britain is shown as follows:

	Exported by Great Britain, Gross Tons	Imported by the United States, Gross Tons	Per Cent to United States
1913.....	178,919	128,070	71.0
1914.....	111,788	82,217	74.0
1915.....	103,077	55,201	53.5

In 1913 about 10,000 tons was imported from Germany.

At the recent annual meeting of the stockholders of the United Steel Company, Canton, Ohio, an increase in the capital stock from $1,500,000 to $18,500,000 was authorized. The company is erecting a new steel plant and enlarging its present plant. None of the new stock will now be sold but it will be turned into the treasury to be used as the expansion of the business requires.

Iron and Steel Markets

PRICE ADVANCES DISTURB

Demand Strong in All Directions

French Buying May Be Less—Activity in Pig Iron After Two Quiet Months

The Pittsburgh advance of $5 a ton on contract plates, shapes and bars, announced Feb. 18, was quite unexpected even by the selling organizations of the companies making it. There was thus none of the "protection" to large users that has sometimes preceded important advances. Nothing in the remarkable price movement of the past four months has so disturbed buyers or impressed them with the chances of surprise in the whole situation.

The considerable amount of capacity in the last half of the year not taken up by contracts at definite prices and the way in which steel companies are fencing against taking on business for such delivery are a little bewildering to buyers. Yet there is no doubt of the increasing tightness of mill schedules. How to take care of customers and yet get some advantage of the high prices made by war demand is the despair of producers.

The tide is still rising, both in prices and demand. Railroad and shipyard buying, particularly the latter, is strong. A new pig-iron movement, too, is under way.

Steel companies are puzzled over the probable French buying of shell steel here in the remainder of the year. One advice is that the French Government and the Schneider interests will not need the several hundred thousand tons they were expected to take in addition to 100,000 tons or more recently placed. It is added that because of high prices here France has been providing more steel capacity and is buying more steel from England. But neither of these moves is new.

It is not clear how far implement makers covered their wants before the $5 advance in bars, but it is known that a good deal of this business is yet to be placed, and that at all events little has been covered beyond Jan. 1.

Two new ore vessels for the Steel Corporation were placed at Lake yards last week, making five in all, and another is pending. It is now a question of getting further deliveries of such boats before midseason of 1917. Two vessels have just been placed with the New York Shipbuilding Company by the Coastwise Transportation Company and two with the Cramp yard by W. R. Grace & Co. More than 250 merchant vessels are now under contract in the country. The steel for four Lake boats, 13,500 tons, went on the books last week.

Late rail contracts include 7000 tons for the Monon and 10,000 tons for the Central of Georgia. The New York Municipal Railways will buy 13,000 tons and the Interborough 3500 tons. Car orders include 1500 for Cuba and the Illinois Central is about closing. Locomotive buying goes on, a total of 160 having been taken in the past two weeks, with 400 under inquiry.

Few plate mills will now accept less than 3c., Pittsburgh, on deliveries in the first half of the year. Sheet prices, on the other hand, have not kept pace with the heavier products.

The week's price advances include $6 on rivets, 10 per cent on nuts and bolts and $5 on hoops and bands. Store prices on bars, plates and shapes have gone up along with mill advances. Shafting from store has sold at the list price, breaking all precedents. There are signs that quite a little shafting is being bought for shrapnel noses.

Pig iron, after two months of comparative quiet, is really active again, notably on the steel side. At St. Louis 15,000 tons of Southern basic was bought; in southern Ohio contracts for 30,000 and 40,000 tons of Northern basic were closed, the former with a central Ohio maker and the latter with Ohio River furnaces; and at Youngstown 20,000 tons of Bessemer was sold for delivery up to July at $19.75 at furnace, or 75c. below previous sales. There has also been heavy aggregate buying in foundry and malleable pig iron, in which all districts have had a hand.

The Steel Corporation has started up 1200 coke ovens at Gary, W. Va., idle for several years. Its small furnace at Niles, Ohio, has blown in, and it has been even proposed to start Steubenville and Zanesville, Ohio, furnaces which have long been regarded as practically abandoned.

Furnace operations are not fully efficient. There is complaint of poor coke, and some linings are getting thin. Furnacemen dwell on these facts, also on possible ore and labor scarcity, in making predictions of higher prices later in the year. The halt and in some cases slight recession in pig iron prices, along with scrap prices, are expected to give way to firmness as the steel situation makes itself felt in pig iron.

Ferromanganese has sold at $150 on contract for the last half and $225 for spot, and most sellers are now out of the market. In ferrosilicon the scarcity is equally serious and probably more.

Pittsburgh

PITTSBURGH, PA., Feb. 22, 1916.

The market is going at a very fast pace, and a stopping place in the advance in prices seems to be far off. The past week plates, shapes and steel bars were put up $5 per ton, hoops and bands $5, iron bars $5, nuts and bolts about 10 per cent, and rivets $6 per ton. Some in the trade are viewing the skyrocket prices now ruling with a degree of alarm, believing that when the reaction sets in, which it is bound to do sooner or later, there will be a severe reckoning. Reports from the building trades are that the season is dull, and few large structures involving heavy costs are under way. Prices of material, labor and all incidentals are abnormally high. As yet there is nothing in sight to indicate that the rapid pace of the past eight months is not going to last for some time. On the contrary, all indications point the other way. Predictions are freely made that by July prices on nearly all iron and finished products will be $5 per ton or more higher than they are now. Consumers are still insisting on the mills taking their orders for last half delivery, the makers to fix the prices. One large steel

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

Pig Iron, Per Gross Ton:	Feb. 23, 1916.	Feb. 16, 1916.	Jan. 26, 1916.	Feb. 24, 1915.
No. 2 X, Philadelphia...	$20.00	$20.00	$20.00	$14.25
No. 2, Valley furnace...	18.25	18.25	18.50	13.00
No. 2 Southern, Cin'ti...	17.90	17.90	17.90	12.40
No. 2, Birmingham, Ala.	15.00	15.00	15.00	9.50
No. 2, furnace, Chicago*	18.50	18.50	18.50	13.00
Basic, del'd, eastern Pa.	19.50	19.50	19.50	13.50
Basic, Valley furnace...	17.75	17.75	17.75	12.50
Bessemer, Pittsburgh...	*20.70*	21.45	21.45	14.55
Malleable Bess., Ch'go*..	19.00	19.00	19.00	13.00
Gray forge, Pittsburgh...	18.45	18.45	18.45	13.45
L. S. charcoal, Chicago..	19.75	19.75	19.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	**35.00**	33.00	32.00	19.50
O.-h. billets, Pittsburgh..	35.00	35.00	33.00	19.50
O.-h. sheet bars, P'gh...	35.00	35.00	35.00	20.50
Forging billets, base, P'gh	55.00	55.00	55.00	24.00
O.-h. billets, Phila.....	42.00	42.00	42.00	21.52
Wire rods, Pittsburgh...	50.00	50.00	45.00	25.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	2.409	2.409	2.259	1.20
Iron bars, Pittsburgh....	**2.25**	2.15	2.00	1.10
Iron bars, Chicago.....	1.90	1.90	1.90	1.10
Steel bars, Pittsburgh...	**2.50**	2.25	2.10	1.10
Steel bars, New York...	2.669	2.669	2.269	1.269
Tank plates, Pittsburgh..	**2.75**	2.50	2.25	1.10
Tank plates, New York..	**3.169**	2.919	2.519	1.269
Beams, etc., Pittsburgh..	**2.25**	2.00	1.90	1.10
Beams, etc., New York..	**2.419**	2.169	2.069	1.269
Skelp, grooved steel, P'gh	2.00	2.00	1.90	1.10
Skelp, sheared steel, P'gh	2.10	2.10	2.00	1.15
Steel hoops, Pittsburgh..	**2.50**	2.25	2.00	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Feb. 23, 1916. Cents.	Feb. 16, 1916. Cents.	Jan. 26, 1916. Cents.	Feb. 24, 1915. Cents.
Sheets, black, No. 28, P'gh.	2.60	2.60	2.60	1.80
Galv. sheets, No. 28, P'gh	4.75	4.75	4.75	3.40
Wire nails, Pittsburgh...	2.30	2.30	2.20	1.60
Cut nails, Pittsburgh....	2.20	2.20	2.10	1.55
Fence wire, base, P'gh..	2.15	2.15	2.05	1.40
Barb wire, galv., P'gh...	3.15	3.15	3.05	2.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	17.25	17.25	17.50	11.75
Iron rails, Philadelphia.	19.50	19.50	19.50	13.00
Carwheels, Chicago.....	*13.50*	13.75	14.25	10.00
Carwheels, Philadelphia..	16.50	16.50	16.50	11.00
Heavy steel scrap, P'gh..	17.00	17.00	17.50	11.75
Heavy steel scrap, Phila.	16.50	16.50	16.50	10.00
Heavy steel scrap, Ch'go.	14.75	14.75	15.25	9.75
No. 1 cast, Pittsburgh...	*15.25*	15.75	15.75	11.25
No. 1 cast, Philadelphia.	17.00	17.00	17.00	12.00
No. 1 cast, Ch'go (net ton)	12.75	12.75	13.00	9.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	*$3.50*	$3.75	$3.00	$1.50
Furnace coke, future....	2.50	2.50	2.50	1.65
Foundry coke, prompt...	3.50	3.50	3.50	2.00
Foundry coke, future....	3.25	3.25	3.25	2.15
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York..	*27.37½*	27.37½	25.50	15.25
Electrolytic copper, N. Y.	27.25	27.25	25.37½	14.62½
Spelter, St. Louis.....	**21.25**	20.00	19.00	9.35
Spelter, New York.....	**21.50**	20.25	19.25	9.50
Lead, St. Louis.....	**6.22½**	6.15	6.00	3.77½
Lead, New York.....	**6.30**	6.25	6.10	3.85
Tin, New York.....	*42.20*	42.25	42.12½	38.60
Antimony, Asiatic, N. Y.	**44.00**	43.50	42.00	18.00
Tin plate, 100-lb. box, P'gh.	$4.00	$4.00	$3.75	$3.10

interest has sold many thousands of tons of material for delivery over the next six to nine months, prices to be adjusted at the time shipments are made. These contracts are all said to contain non-cancellation clauses. Mills are not catching up on deliveries, but seem to be getting further back, and consumers are suffering a good deal in operations because of the fact that the mills are not supplying raw materials more promptly. The only decline in prices the past week was in Bessemer pig iron, sales of about 20,000 tons to a Youngstown consumer having been made at $20, delivered, equal to $19.75 at seller's furnace, and slightly less at one or two furnaces. The scrap market is dull, and prices on some grades are easier.

Pig Iron.—The Youngstown Sheet & Tube Company has bought about 20,000 tons of Bessemer iron and about 5000 tons of forge iron for delivery up to July. For the Bessemer iron the company paid $20, delivered, equal to $19.75 or slightly less at furnace, and for the forge $17.50 at furnace. This is the first sale of Bessemer iron made for some weeks, and establishes the price at about $19.75, Valley furnace. We also note sales of 2000 tons of malleable Bessemer iron at $18.50, and 1500 tons of gray forge at $17.50, both at Valley furnace. Prices on No. 2 foundry are only fairly strong, and new demand is not active. There is no inquiry for basic, which is fairly firm at $17.75, Valley furnace. We quote standard Bessemer iron at $19.75; basic, $17.75; malleable Bessemer, $18.50; gray forge, $17.25 to $17.50, and No. 2 foundry, $18.25 to $18.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh and Cleveland districts being 95c. per ton.

Billets and Sheet Bars.—There is a fair amount of inquiry for billets and sheet bars, and prices quoted usually stagger the prospective buyer. A sheet mill that was asking prices recently on 1500 tons of sheet bars, Bessemer or open-hearth stock, was quoted $40 at makers' mill. Needless to say the offer was not accepted by the consumer. Bessemer open-hearth billets for prompt shipment bring $35 to $38, and sheet bars about the same. As against this, some consumers of sheet bars who have sliding scale contracts for first half of this year or longer are getting their bars at about $30, makers' mill. We note a sale of 50 to 60 tons of high carbon forging billets at $67.20 per ton, and 150 tons of ordinary carbon forging billets at $55 per ton, f.o.b. Pittsburgh. Nominal prices are as follows: Bessemer billets and sheet bars, $34, and open-hearth billets and sheet bars $34 to $35, maker's mill, Pittsburgh or Youngstown district. We quote forging billets at $55 to $56, for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 per ton extra.

Ferroalloys.—The situation as regards the supply of ferromanganese is more serious, and very high prices are said to have been paid for some small lots for prompt shipment. From $225 up to $250 is quoted for 80 per cent English or domestic ferromanganese for quick shipment from stock. The price of English 80 per cent on contracts is $150, seaboard, without any guarantees as to deliveries. There has been an advance of $5 per ton on 20 per cent spiegeleisen, and it is quoted at $45. We quote 50 per cent ferrosilicon for delivery through all of 1916 as follows: Up to 100 tons, $85; over 100 tons and up to 600 tons, $84, and over 600 tons, $83; all per gross ton, delivered in the Pittsburgh district. Prices of Bessemer ferrosilicon for delivery in second quarter are as follows: 9 per cent, $27; 10 per cent, $28; 11 per cent, $29; 12 per cent, $30; 13 per cent, $31.50; 14 per cent, $33.50; 15 per cent, $35.50, and 16 per cent, $38. Seven per cent silvery for same delivery is $24.50; 8 per cent, $25; 9 per cent, $25.50; 10 per cent, $26; 11 per cent, $27, and 12 per cent, $28. All these prices are f.o.b. at furnace, Jackson, Ohio; New Straitsville, Ohio, or Ashland, Ky., each of these points having a freight rate of $2 per gross ton to Pittsburgh.

Plates.—Mill prices on plates were advanced $5 per ton last Friday, and are now 2.35c. at mill, for delivery in third or fourth quarter of this year. For shipment in six to eight weeks or longer, ¼-in. and heavier plates are 2.50c. to 2.75c. at mill, with reports of sales at 3c. The American Car & Foundry Company has taken 1200 freight cars for the Cuban Railway. It is said the Southern Pacific is figuring on buying 1300 to 1500 more cars. The Standard Steel Car Company will build 50 steel hopper cars for the Lake Erie, Franklin & Clarion. Nearly all plate mills are filled up for the remainder of this year. We quote ¼-in. and heavier plates at 2.25c. for delivery in last quarter, and 2.50c. to 2.75c. for delivery in second and third quarter, f.o.b. Pittsburgh.

Structural Material.—The new inquiry is very active. The Massillon Bridge & Structural Company, Massillon, Ohio, has taken 1025 tons for the German-American Cement Company's plant at La Salle, Ind.; the Jones & Laughlin Steel Company, 400 tons for an office building and immigrant station for the Pennsylvania Railroad at Philadelphia; W. N. Kratzer Company, for the Grasseli Chemical Company, for its Niles, Ohio, plant, 283 tons, for ore docks and buildings for its New Jersey plant about 900 tons, for its Indiana plant 140 tons, and for its Meadowbrook, W. Va., works, 225 tons. We quote beams and channels up to 15 in. at 2.25c. to 2.50c., prices depending entirely on deliveries wanted.

Steel Rails.—It is stated that the local interest has taken recently several fairly large contracts for standard sections for early delivery, and it is booking orders for light rails at the rate of 4000 to 5000 tons or more per week. We quote light rails as follows: 25 to 45 lb. sections, 1.70c.; 16 and 20 lb., 1.75c.; 12 and 14 lb., 1.80c.; 8 and 10 lb., 1.85c., in carload lots. An advance of 5c. per 100 lb. is charged for less than carloads and down to three tons, while under three tons an additional 5c. is charged. We quote standard section rails of Bessemer stock at 1.25c. and of open-hearth steel, 1.34c., Pittsburgh.

Sheets.—The mills report a continued heavy demand for sheets, notably for blue annealed and electrical. The demand for the former is heavier than ever known before, and most mills are sold up to July or later. Automobile builders and users of special sheets for deep stamping and other purposes are buying heavily, while the demand for box annealed and galvanized is also active. Sheet mills are having trouble in getting prompt deliveries of bars, and this is cutting down output to some extent. A large Youngstown sheet mill was shut down all last week for lack of steel. Prices are very strong and likely to be higher. For delivery in second quarter we quote: Nos. 9 and 10 blue annealed sheets, 2.65c. to 2.75c.; No. 28 Bessemer black, 2.60c.; open-hearth, 2.70c.; No. 28 galvanized sheets from Bessemer stock, 4.75c., and from open-hearth, 4.85c., at maker's mill. We quote Nos. 22 and 24 black plate, tin mill sizes, H. R. and A. 2.40c.; Nos. 25, 26 and 27, 2.45c.; No. 28, 2.50c.; No. 29, 2.60c., and No. 30, 2.70c. These prices are for carloads and larger lots, f.o.b. maker's mill, but some makers are quoting higher figures.

Tin Plate.—The base price of bright tin plate now seems to be firm at $4 per box, practically all the mills quoting this on deliveries from stock, and also on new orders for second half shipment. It is estimated there are 2,000,000 or more boxes of tin plate yet to be placed for last half delivery, and it seems certain that this business will bring $4 per box. The export inquiry is heavy, but local mills are filled up for months ahead on domestic specifications, and not able to take on much foreign business. We quote 14 x 20 coke plates at $4 per base box, and 200 lb. base, common ternes, 8 lb. coating, at $6.90 per box.

Railroad Spikes.—The new demand from the railroads is light, and specifications are not very active. Some jobbers who have stocks of spikes bought some time ago at low prices are shading mill prices. We quote:

Standard railroad spikes, 4½ x 9/16 in. and larger, $2.35; railroad spikes, ½ and 7/16 in., $2.50 base; railroad spikes, ⅜ in. and 5/16 in., $2.60 base; boat spikes, $2.50 base, all per 100 lb., f.o.b. Pittsburgh.

Wire Rods.—It is claimed that as high as $60 has been paid recently for small lots of open-hearth rods for prompt shipment. The leading interest and other makers are quoting $50 to regular customers for deferred deliveries. Rods are very scarce, and the three local makers have not been selling to any extent in the open market for some time. We quote Bessemer, open-hearth and chain rods at $50 per ton, f.o.b. makers' mill, but for prompt shipment $5 to $10 per ton more could likely be obtained.

Skelp.—There is much activity in the skelp trade, the demand being heavy, and mills have their output sold up for four or five months. Prices are very strong and likely to go higher. We quote: Grooved steel skelp, 2c. to 2.05c.; sheared steel skelp, 2.10c. to 2.15c.; grooved iron skelp, 2.40c. to 2.45c., and sheared iron skelp, 2.50c. to 2.55c., all delivered to consumers' mills in the Pittsburgh district.

Wire Products.—The demand for plain and barb wire continues enormously heavy, and local mills are turning down nearly every day export inquiries on which they cannot figure and take care of domestic trade. There is an acute shortage in the supply of wire and wire nails, and it is predicted that nails will be $3 per keg by July. Mills are sold up for months ahead and are not quoting, while very high premiums are being offered by both domestic and export buyers for fairly prompt shipments. Prices quoted by the mills to the large trade only, on which shipment would probably not be made for three or four months, are as follows: Wire nails, $2.30; galvanized, 1 in. and longer, taking an advance over this price of $2, and shorter than 1 in., $2.50; plain annealed wire, $2.15; galvanized barb wire and fence staples, $3.15; painted barb wire, $2.45; polished fence staples, $2.45; cement coated nails, $2 base, all f.o.b. Pittsburgh, with freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are one point lower and are now quoted at 63½ per cent off list for carload lots; 62½ per cent for 1000-rod lots, and 61½ per cent for small lots, f.o.b. Pittsburgh.

Hoops and Bands.—Effective Friday, Feb. 18, the Carnegie Steel Company and other makers advanced prices $5 per ton, marking up hoops from 2.25c. to 2.50c. and bands from 2c. to 2.25c. The new demand and specifications for both hoops and bands are beyond all precedent, and the mills are congested with orders and very much behind in deliveries. It is said prices will likely be higher before long. We now quote steel hoops at 2.50c. and steel bands at 2.25c., with extras on the latter as per the steel bar card. These are mill prices for delivery in last half of the year.

Nuts and Bolts.—Prices on nuts and bolts were advanced Wednesday, Feb. 16, 5 to 10 per cent, due to the heavy demand which is much beyond the capacity of the makers to supply promptly, and also to the higher prices on steel, and poor deliveries from the mills. Makers of nuts and bolts have their output sold up for some time ahead, and are very much back in deliveries. The new discounts, which, it is said, are for quick deliveries only, are as follows:

Machine bolts, h. p. nuts, ¾ x 4 in., smaller and shorter, rolled, 65 and 10 per cent; smaller and shorter, cut, 65 and 5 per cent; larger or longer, 50 and 20 per cent.

Machine bolts, c. p. c. and t. nuts, ⅜ x 4 in., smaller and shorter, 60 and 10 per cent; larger or longer, 50 and 10 per cent.

Common carriage bolts, ⅜ x 6 in., smaller and shorter, rolled, 65 and 5 per cent; smaller and shorter, cut, 65 per cent; larger or longer, 50 and 15 per cent.

Blank bolts, 50 and 20 per cent. Tap bolts, 30 per cent. Bolt ends, with h. p. nuts, 50 and 20 per cent; c. p. c. and t. nuts, 50 and 10 per cent. Stud bolts, rough, 45 per cent; lag screws, cone or gimlet point, 65, 10 and 5 per cent.

Nuts, blank or tapped, h. p. square, 3.70c. lb. off; h. p. hexagon, 3.80c. lb. off; c. p. c. and t. square, 3.50c. lb. off; hexagon, 4.25c. lb. off; c. p. semi-finished, hexagon, 75 and 10 per cent. Finished case hardened nuts, 75 per cent.

Rivets.—Effective Wednesday, Feb. 16, prices on rivets were advanced $6 per ton. Makers report demand abnormally heavy, and they are very much back in shipments. They also state deliveries of steel from the mills are unsatisfactory. We now quote button-head structural rivets, ½ in. and larger, at $2.90 to $3 and cone-head boiler rivets at $3 to $3.10 per 100 lb. in car-load lots, f.o.b. Pittsburgh. Smaller lots bring about 10c. advance. Discount on small rivets is now 60, 10 & 10.

Shafting.—As high as 10 per cent off list has been quoted for fairly prompt delivery. Mills are filled up for five or six months. We quote cold-rolled shafting at 40 per cent off in carloads and 35 per cent in less than carloads, f.o.b. Pittsburgh, and for delivery in second half of the year.

Iron and Steel Bars.—It is said that the large Western implement makers who recently covered their needs on steel bars for the second half of the year did so on the basis of 1.90c. or not higher than 2c., Chicago.

Local makers say they have not taken contracts from the implement makers for second half delivery, and are inclined to quote higher prices. On Friday, Feb. 18, mill prices on steel bars were advanced to 2.25c. for deferred deliveries, probably in last quarter of this year. Prices on refined iron bars are higher, and mills are filled up for several months. We quote steel bars at 2.25c. for delivery in third and fourth quarters, and 2.50c. to 2.75c. for delivery in four to five weeks. Prices from warehouse range from 2.75c. up, depending on quantity. We quote refined iron bars at 2.25c. to 2.30c. and railroad test bars at 2.30c. to 2.40c., f.o.b. mill, Pittsburgh.

Merchant Steel.—The new demand continues very heavy, and the mills are back in deliveries eight or ten weeks. Prices are very strong, and likely to be higher. On small lots for delivery at convenience of the mill, which would be in the third or fourth quarter, we quote: Iron finished tire, ½ x 1½ in. and larger, 2.05c., base; under ½ x 1½ in., 2.20c.; planished tire, 2.25c.; channel tire, ¾ to ⅞ and 1 in., 2.55c. to 2.65c.; 1 x ⅛ in. and larger, 2.95c.; toe calk, 2.65c. to 2.75c., base; flat sleigh shoe, 2.40c.; concave and convex, 2.45c.; cutter shoe, tapered or bent, 2.95c. to 3.05c.; spring steel, 2.65c. to 2.75c.; machinery steel, smooth finish, 2.45c.

Cold-Rolled Strip Steel.—The new demand is fairly heavy, and most consumers are covered on their needs to July, and in other cases through the year. The mills are filled up for four or five months, and premiums are readily paid for fairly prompt shipment. We quote cold-rolled strip steel at $4 base for delivery at convenience of the mill, extras which are standard with all the makers being in part as follows:

Base price for 1½-in. and wider, hard, in coils, 0.10 to 0.19 carbon. Extras for size, annealing, cutting, etc., as follows:

Thickness	0.100-in. and thicker	0.050-in. to 0.099-in.	0.036-in. to 0.049-in.	0.035-in.	0.031-in. to 0.034-in.	0.026-in. to 0.030-in.	0.025-in.	0.020-in. to 0.024-in.
Extra for thickness	...	.05	.20	.20	.35	.45	.45	.55
Extra for annealing	.25	.25	.25	.25	.40	.40	.40	.40
Width Extras								
Under 1½ to 1-in. inc.	.15	.15	.15	.15	.15	.15	.15	.15
Under 1 to ⅜-in. inc.	.30	.30	.30	.30	.30	.30	.30	.30
Wider than 6, not over 9-in.	...	...	...	...	...	...	.25	.25
Wider than 9, not over 12-in.	...	...	...	.25	.25	.25	.50	.50
Wider than 12, not over 15-in.	...	...	...	.50	.50	.50	...	...
Cut Lengths Extra								
1-in. and wider	.10	.15	.15	.15	.25	.40	.40	.50
Under 1-in. to our limits	.25	.50	.50	.50	.75	.75	.75	.75

Reductions for carload lots of a size. For orders 18 tons or over, one width and gage, shipment at one time, there is a regular reduction from the net price of 15c. per cwt.

For all tempers other than full hard for flat work add annealing extra.

Carwheels.—Several large contracts for steel wheels have been placed lately with the two local makers for deferred shipment. We quote: 33-in. freight carwheels in lots of 1000 or more at $18; 33-in. tender wheels, $21; 36-in. passenger or tender wheels, $25. These prices are based on a 10-in. diameter hub, 50c. extra being charged for 1-in., all f.o.b. Pittsburgh.

Wrought Pipe.—Consumers are importuning the mills to take orders for tubular goods for July and later delivery, but the makers are not inclined to do so. The Philadelphia company of this city is in the market for 50 miles of 6-in. steel pipe for a gas line, and for 12,000 couplings for it. An Ohio company is also in the market for 50 miles of 6, 8 and 10-in. pipe for a gas line for June and July shipment. The current demand is active, and mills are filled up for two or three months. Discounts given on another page are firmly held.

Boiler Tubes.—Makers report the new demand for merchant and locomotive tubes very heavy, and on the latter they are sold up for six months or longer. Discounts on iron and steel tubes given on another page are very firm, and makers say prices will be higher in the near future.

Old Material.—Despite reports to the contrary, the local scrap market is dull and neglected. There seems to be too much scrap available, the mills being filled up, and say they do not want scrap even at low prices. Heavy steel scrap, borings and turnings, and low phosphorus melting stock are weak, with offerings heavy. A Sharon interest recently refused to take on 3000 tons of heavy steel scrap at $17 delivered. No large sales were made in this market in the past week. Dealers quote for delivery in the Pittsburgh and nearby districts that take the same rates of freight as follows, per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	$17.00
Compressed side and end sheet scrap	$15.50 to 15.75
No. 1 foundry cast	15.25 to 15.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	13.25 to 13.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	17.00
No. 1 railroad malleable stock	15.00 to 15.25
Railroad grate bars	12.00 to 12.25
Low phosphorus melting stock	20.50 to 21.00
Iron car axles	25.00 to 25.50
Steel car axles	24.00 to 24.50
Locomotive axles, steel	29.50 to 30.00
No. 1 busheling scrap	14.50 to 14.75
Machine shop turnings	9.50 to 9.75
Old carwheels	15.50 to 15.75
Cast-iron borings	11.00 to 11.25
Sheet bar crop ends	18.00 to 18.25
Old iron rails	16.00 to 16.50
No. 1 railroad wrought scrap	18.50 to 19.00
Heavy steel axle turnings	14.50 to 14.75
Heavy breakable cast scrap	14.25 to 14.50

Coke.—Last week the car situation was bad, and some Valley consumers of blast furnace coke had to come in the market and buy some prompt coke to help out, as they were running short. We note sales of 35 to 40 cars of high grade prompt furnace coke at about $3.75 per net ton at oven. On Monday and Tuesday this week, the car supply was better, and prices of prompt coke went off about 25c. per ton. Shippers say they are constantly having trouble to get enough cars. There is no new inquiry for contract furnace coke, as buyers will not likely come in the market for their last half coke for several months. There is a fair demand for foundry coke, and prices are strong. We quote best grades of blast furnace coke for spot shipment at $3.50, and perhaps a little lower could be done, while on contracts for second half there is no fixed price. It is likely furnace coke for second half delivery will be low, as a very large number of by-product coke ovens now being built will be making coke by July. We quote high grade 72-hr. foundry coke for prompt shipment at $3.50 to $3.75, and on contracts $3.25 to $3.50 per net ton at oven. The Connellsville *Courier* gives the output of coke for the week ended Feb. 12 as 441,309 tons, an increase over the previous week of 8127 tons.

Chicago

CHICAGO, ILL., Feb. 23, 1916—(*By Wire*).

The trade has observed the laying on of a $5 per ton increment in the prices of the principal steel products with varying opinion. Local mills, having previously cared for regular customers in a manner both careful and substantial if not wholly satisfying, will profit from the level of prices established by export transactions only to the extent of a limited tonnage. Purchases in this market by domestic consumers on the new basis will accordingly be attended with less of justifiable complaint than may be heard elsewhere. A sale of 1200 tons of bars for last half at 2.25c., Pittsburgh, is already reported. The advance of $3 per ton for steel out of stock trails the mill announcement and preserves the relatively favorable basis for store buying which this market has offered for some time. The railroads are beginning to indicate their recognition of the special conditions applicable to rails, the price of which is relatively very low, and interest in future requirements is appearing. Bookings for 1917 are reported. Buying of 6000 tons of tie-plates is noted, of which the Chicago, Milwaukee & St. Paul took 3700 tons. In structural lines no important tonnage is appearing and it seems likely that, if work is being deferred, such determination is reached before the work comes up for definite figures. Deliveries for which premium prices are asked have now been extended to the full period of the first half. Prices for sheets are apparently held in partial check by

reason of the very limited demand. Iron bars are higher, and a sale of 100 tons at 2c., Chicago, is reported. In the pig-iron market more activity is shown, with numerous sales of Northern and Southern foundry iron in lots up to 2000 tons. Sales of about 35,000 tons of Southern basic, coupled with the entrance of a well-known Southern producer upon the manufacture of this iron for the first time, is an interesting feature of the week.

Pig Iron.—A number of sales of both Northern and Southern foundry iron, in lots of from 500 to 1200 tons, have been made in the past week, as well as one of 2000 tons of malleable to a local melter. Inquiry is somewhat heavier, though there is no marked change in the situation. The decision of one of the important Southern producers to enter upon the manufacture of basic iron is connected with the sale of about 15,000 tons to the Scullin Steel Company at St. Louis, and a sale of 20,000 tons to a southern Ohio consumer, both for last half delivery. The irregularities in quotations brought out by inquiries for Southern iron continue to persist, but there is still lack of evidence that Southern furnaces are shading prices. For Lake Superior charcoal iron we quote delivery prices at Chicago, including a freight of $1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$19.75
Lake Superior charcoal, No. 1	20.25
Lake Superior charcoal, No. 6 and Scotch	20.75
Northern coke foundry, No. 1	19.00
Northern coke foundry, No. 2	18.50
Northern coke foundry, No. 3	18.00
Southern coke, No. 1 f'dry and 1 soft	$19.50 to 20.00
Southern coke, No. 2 f'dry and 2 soft	19.00 to 19.50
Malleable Bessemer	19.00
Basic	18.50 to 19.00
Low phosphorus	34.00 to 36.00
Silvery, 8 per cent	27.50
Bessemer ferorsilicon, 10 per cent	30.50

(*By Mail*)

Rails and Track Supplies.—By way of contrast with prices of steel in other forms, rail prices now appear especially attractive, and doubtless offers of rails have been made to the mills at figures above the normal level. This condition, together with the general stringency of material supply, is expected to bring an exceptionally early inquiry for 1917 rails. Two important railroads have already put out inquiries and one reservation of 5000 tons has been made for the fall of 1917. Sales of rails for export are noted, one of 700 tons on the basis of $36 at the mill being a particular instance. Prices for spikes, bolts and tie plates were advanced, the latter $5 per ton. We quote standard railroad spikes at 2.50c. to 2.60c., base; track bolts with square nuts, 2.75c. to 2.85c., base, all in carload lots, Chicago; tie plates, $45, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.52c.; 16 to 20 lb., 1.57c.; 12 lb., 1.62c.; 8 lb., 1.67c.; angle bars, 1.50c., Chicago.

Structural Material.—While the market was hardly prepared for the unprecedented advance of $5 per ton, which took effect last week, bringing the Chicago quotation for last-half contracts up to 2.439c., nothing now seems surprising. For the leading interest the new prices will be applicable to a very limited tonnage, and users of structural material in the Chicago district will be less affected perhaps than others. But there is little doubt that some work is being deferred and other construction designed in structural steel will be changed to reinforced concrete, an example of which is presented in the buildings for the University of Illinois, which called for about 900 tons. Contracts for fabricated steel reported for the week carried an aggregate of 4600 tons, distributed among nine jobs, the largest of which was the Schwartz store at El Paso, Tex., involving 1000 tons. The Lakeside Bridge & Iron Works will furnish 700 tons for the Mayfair pumping station, Chicago. The Minneapolis Steel & Machinery Company took 825 tons for a courthouse at Sioux City, Iowa; Hansell-Elcock Foundry Company, 750 tons for Sears, Roebuck & Co.; the Virginia Bridge & Iron Company, 435 tons for a viaduct at Dallas, Tex., and the American Bridge Company, 450 tons for a smelter at Garfield, Utah. Wendnagel & Co., Chicago, will furnish 435 tons for three jobs, including a local theater and schoolhouse. The important new inquiry for cars is that of the Chicago & Northwestern for a total of 3500, in addition to which a number of miscellaneous lots are noted. We quote for Chicago delivery of plain material from mill 2.439c.

Prices for material out of stock, at Chicago, continue to be more favorable to the buyer than those generally obtainable elsewhere, and paralleling the advance of $5 in mill prices, an increase of but $3 per ton is announced from store. We quote for Chicago delivery of structural steel out of stock 2.75c.

Plates.—While the price being obtained for plates for prompt shipment have prepared the trade for exceptionally high quotations, the advance to the basis of 2.35c., Pittsburgh, for last half contracts and sales at 3c., Pittsburgh, for deliveries in July, are none the less notable. There are a number of inquiries for round tonnage of plates for export in this market, but only occasionally is business being taken. The demand for shipbuilding plates predominates. We quote for Chicago delivery of plates from mill 2.539c.

With the advance of $3 per ton in prices of plates out of stock, effective this week, quotations will exceed 3c. Up to this time store prices have been lower than mill prices by a large margin where deliveries at all comparable in promptness were desired. We quote for Chicago delivery of plates out of stock 3.05c.

Sheets.—The limited demand for galvanized and one-pass sheets serves to hold in check the prices of these materials which many sheet mills feel they must move even though at a small margin of profit over the cost of sheet bars. There has been therefore, no advance corresponding to the new prices in heavy lines. For blue annealed sheets the demand is distinctively heavier than for the lighter gages, except in the case of highly finished sheets which are moving freely to automobile manufacturers at high prices. We quote for Chicago delivery from mill, No. 10 blue annealed, 2.939c.; No. 28 black, 2.889c.; No. 28 galvanized, 5c.

Higher quotations for sheets out of stock become effective this week and we quote for Chicago delivery from jobbers' stock, minimum prices applying on bundles of 25 or more, as follows: No. 10 blue annealed, 2.95c.; No. 28 black, 3c. to 3.10c.; galvanized, 22 gage and lighter, on the basis of 5.15c.; 5.25c. for No. 28; 20 gage and heavier, on the basis of 4.80c. to 4.90c. for No. 28, the usual differentials obtaining.

Bars.—Sales of steel bars under last half contracts on the basis of the latest advance to 2.25c., Pittsburgh, have already been made, one such transaction involving 1200 tons. With the higher prices prevailing for bars, a corresponding advance may be expected in a very large number of more highly finished products for which bars are the raw material. For high-carbon steel it is the expectation of local makers to offer a price level corresponding to the new mild-steel prices. Reports of advances in the price of bar iron to 1.95c. and 2c. are not yet supported by the quotations of all of the mills, but that this higher level will be reached shortly seems assured. We quote mill shipments, Chicago, as follows: Bar iron, 1.90 to 2c.; soft steel bars, 2.439c.; hard steel bars, 2c. to 2.25c.; shafting, in carloads, 45 per cent off; less than carloads, 40 per cent off.

The price of bars out of store is up $3 per ton and we quote store prices for Chicago delivery: Soft steel bars, 2.65c.; bar iron, 2.65c.; reinforcing bars, 2.65c., base, with 5c. extra for twisting in sizes 1/2 in. and over and usual card extras for smaller sizes; shafting 15 per cent off.

Rivets and Bolts.—Any question as to the consistency with which recent prices for rivets and bolts were being maintained is largely removed by reason of the sharp advance in the price of bars. While the reselling of bolts under profitable contracts continually brings out irregular figures, these transactions are limited to small quantities and the large users appear to find no way of evading the top prices, as is evidenced by purchases this week by a large automobile manufacturer at Detroit. The prices of rivets on the basis of 2.80c., Pittsburgh, become unquestionable in their firmness. Effective Feb. 16, new bolt and nut discounts were announced and we quote as follows: Carriage bolts up to 3/8 x 6 in., rolled thread, 65-5; cut thread, 65; larger sizes, 50-15; machine bolts up to 3/8 x 4 in., rolled thread, with hot pressed square nuts, 65-10; cut thread, 65-5;

larger sizes, 50-20; gimlet point coach screws, 65-10-5; hot pressed nuts, square, $3.70 off per 100 lb.; hexagon, $3.80 off. Structural rivets, ¾ to 1¼ in., 2.95c. to 3c., base, Chicago, in carload lots, boiler rivets, 10c. additional.

We quote prices, out of store: Structural rivets, 2.95c.; boiler rivets, 3.05c.; machine bolts up to ⅞ x 4 in., 70-12½; larger sizes, 65-10; carriage bolts up to ¾ x 6 in., 70-5; larger sizes, 65 off; hot pressed nuts, square, $4.50, and hexagon, $4.70 off per 100 lb.; lag screws, 75.

Cast-Iron Pipe.—The principal inquiries for municipal pipe include 7200 tons for St. Louis, 2500 tons for Los Angeles and 1600 tons for Cincinnati. An award of 300 tons at Bay City, Mich., was made to the Glamorgan Pipe & Foundry Company and of 650 tons at Rockford, Ill., to the American Cast Iron Pipe Company. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $32.50 to $33; 6 in. and larger, $29.50 to $30, with $1 extra for class A water pipe and gas pipe.

Wire Products.—With unfilled orders for certain kinds of nails sufficient for six months' operation and a similar, though less extreme, condition applying to barb wire and plain wire, the condition of the wire mills is obvious. Recent refusals to quote on export business are a part of the effort by the mills to care for domestic trade as far as possible. With consumer demand now very active, there is not yet apparent any disinclination to refrain from contracting because of high prices but a hand-to-mouth buying policy may later develop. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $2.339; wire nails, $2.489; painted barb wire, $2.639; galvanized barb wire, $3.339; polished staples, $2.639; galvanized staples, $3.339, all Chicago.

Old Material.—Except for a renewal of inquiry for heavy steel scrap for a local melter and a picking up of small lots of rolling-mill grades by an iron mill where concessions in prices have been offered, the scrap market moved very slowly last week. Actual reductions in the level of prices were few but the downward tendency of the market is not yet checked. Offerings of scrap from the railroads total nearly 15,000 tons, which aggregate represents in part accumulations which a shortage of cars prevented moving. The tonnage includes 4600 tons from the Santa Fé, 2500 tons from the Burlington, 2000 tons from the Rock Island and 1300 tons from the Wabash. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$17.25 to $17.75
Relaying rails	19.50 to 20.50
Old carwheels	13.50 to 14.00
Old steel rails, rerolling	17.00 to 17.50
Old steel rails, less than 3 ft	16.25 to 16.50
Heavy melting steel scrap	14.75 to 15.25
Frogs, switches and guards, cut apart	14.75 to 15.25
Shoveling steel	14.25 to 14.75
Steel axle turnings	11.50 to 12.00

Per Net Ton	
Iron angles and splice bars	$17.00 to $17.25
Iron arch bars and transoms	18.00 to 18.50
Steel angle bars	14.00 to 14.50
Iron car axles	19.50 to 20.00
Steel car axles	21.50 to 22.00
No. 1 railroad wrought	14.75 to 15.25
No. 2 railroad wrought	14.00 to 14.25
Cut forge	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
No. 2 busheling	8.75 to 9.00
Pipes and flues	10.50 to 11.00
Steel knuckles and couplers	14.50 to 15.00
Steel springs	15.25 to 15.75
No. 1 boilers, cut to sheets and rings	10.25 to 10.75
Boiler punchings	13.75 to 14.25
Locomotive tires, smooth	17.00 to 17.50
Machine shop turnings	7.75 to 8.00
Cast borings	7.00 to 7.25
No. 1 cast scrap	12.75 to 13.00
Stove plate and light cast scrap	10.75 to 11.00
Grate bars	11.00 to 11.25
Brake shoes	10.25 to 10.75
Railroad malleable	13.25 to 13.50
Agricultural malleable	11.00 to 11.50

The Pittsburgh Steamship Company has placed an order with the American Shipbuilding Company for two 12,000-ton bulk freight boats for 1917 delivery. They will be 600 ft. long, 580 ft. keel, 60 ft. beam and 32 ft. deep, being duplicates of three other boats now being built for the Pittsburgh Steamship Company. It has also ordered another 600-ft. boat from the Great Lakes Engineering Works.

Philadelphia

PHILADELPHIA, PA., Feb. 23, 1916.

The demand for steel shows no cessation and prices are higher. A manufacturer of sheets, plates and billets reports that the requests for the booking of third quarter needs are becoming overwhelming, and that orders for that quarter will soon be taken, but at advanced prices. An eastern Pennsylvania mill has placed its minimum quotation for plates at 3.25c., Pittsburgh, while another important maker does not care for any business under 3c., Pittsburgh. It is difficult to place orders for plates at any price. Billets have been advanced. Billets of an inferior quality, made from croppings incidental to the rolling of shell rounds, are being offered, and are found acceptable for some uses, particularly small angles and concrete reinforcing bars. The market in ferroalloys is extremely strong and as active as the meager supplies will permit. Both spiegeleisen and blast-furnace ferrosilicon are in good demand, and for the former $50, furnace, is asked. Foundry iron has shown greater activity, particularly for second quarter and last half deliveries. Freight embargoes continue to hamper business.

Pig Iron.—The general aspect of the market is good. Some large purchases of foundry iron have been made and more are in prospect, but the business does not appear to have been shared by all of the sellers. Future deliveries are strong and some brands are being taken rapidly; in fact, the bulk of the buying has been for second quarter and last half, although some sellers have done a fair business in prompt deliveries. Plenty of spot iron is available, both standard and off grades. A New Jersey manufacturer is reported to have taken at least 8000 tons of pipe iron, and to be negotiating for more. The William Cramp & Sons Ship and Engine Building Company, Philadelphia, has purchased about 3000 tons of foundry grades. Several transactions, involving from 500 to 2000 tons, have been closed. Prices are generally declared to be strong, although a continuance of shading is found. Makers of eastern Pennsylvania iron continue to quote $20, furnace, as their minimum, but business has been lost at this quotation, and melters declare that offers of considerably under $20, delivered, have been made to them. It is certain, however, that these offerings at concessions are limited in quantity. As a rule, gray-iron foundries are busy. A disturbing circumstance in Trenton is a strike for higher wages by molders in a number of foundries. Basic has been inactive except for two or three small lots. A new plate mill at Pottstown, Pa., has made inquiry for about 1500 tons. The prevailing quotation is $19.50, delivered. There has been good inquiry for standard low phosphorus, and some business has resulted at prices ranging from $32 upward, according to the location of the buyer. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa., No. 2 X foundry	$19.75 to $20.75
Eastern Pa., No. 2 plain	19.50 to 20.50
Virginia, No. 2 X foundry	20.75
Virginia, No. 2 plain	20.25
Gray forge	19.00 to 19.50
Basic	19.50 to 20.00
Standard low phosphorus	32.00

Iron Ore.—The only arrival of foreign ore at this port in the week ended Feb. 19 consisted of 8604 tons from Spain. The recent shipments from that country have been low phosphorus ore.

Ferroalloys.—Following the recent large business in last-half deliveries, the English producers of 80 per cent ferromanganese are about sold up. One agent cannot undertake to sell more than a few carloads, then only to old customers, and for delivery after October. The quotation continues at $150, seaboard. For spot $250, seaboard, has been offered. The Lackawanna Iron & Steel Company has made arrangements to start a furnace at North Cornwall, near Lebanon, Pa., on ferromanganese, using Brazilian ore obtained from an importer and dealer who has heretofore made similar arrangements with other furnaces. The output will be divided between the market and the Lackawanna Steel

Company. A furnace at Dunbar, Pa., is working at full tension on spiegeleisen, the price of which has advanced from $40, furnace, to $50 within a week. Blast-furnace ferrosilicon is in good demand, the quotation for 11 per cent material being $29, furnace, or $32.44, Philadelphia. Last week 363 tons of English ferromanganese arrived at this port.

Bars.—The nominal quotation for steel bars, deliveries at the convenience of the mills, is 2.25c., Pittsburgh, or 2.409c., Philadelphia, but nearby deliveries are more difficult than ever to obtain, some of the sellers having practically gone out of business temporarily. Concrete bars are in good demand, and there is a heavy call for material from which they can be rolled. The makers of iron bars are well sold up, but not to the same extent as the makers of steel bars. They quote 2.409c., Philadelphia, for carload lots.

Plates.—The quotation of 2.35c., Pittsburgh, recently announced by the larger western Pennsylvania interests, does not apply in the case of the eastern Pennsylvania makers. One which has nothing to sell for some months to come has advanced its nominal quotation to 3.25c., Pittsburgh, or 3.409c., Philadelphia. It is operating 14 out of its 16 open-hearth furnaces, whereas it usually has four idle. Another large maker who is striving to catch up on deliveries would prefer not to consider business at less than 3.159c., Philadelphia. A third maker quotes 2.905c. to 3.159c., Philadelphia. The Lenoir Car Works has not yet placed the order for the plates it requires.

Structural Material.—The minimum price quoted by eastern Pennsylvania mills is now 2.409c., Pittsburgh, and 2.50c., Eastern mill, for miscellaneous lots, and the demand is as great as ever, much of it coming from fabricating shops which are stocking up. A theatre and a bank building, each requiring about 200 tons, are under negotiation in this city.

Billets.—The demand for billets is stronger, and the quotations of at least one maker are higher at $42 to $48 for open-hearth rerolling billets, and $55 to $65 for forging steel. The demand for third quarter deliveries is especially strong. Both billets and blooms made from steel discarded in the process of making shell rounds are being offered and have proved acceptable for small angles, concrete reinforcing bars, light rails, etc. The early French specifications for shell steel demanded a 28-per cent discard at the top of the ingot and 4 per cent at the bottom, but this has since been modified, and the total discard is now about 25 per cent.

Sheets.—No. 10 blue annealed sheets are active and strong at 2.959c. to 3.159c., Philadelphia.

Coke.—The market for prompt coke continues uncertain because of the difficulty in making deliveries to many points. With contract coke some makers are slow to enter commitments because they expect higher prices to prevail. Prompt foundry is held at $4 to $4.25 per net ton at oven, and contract foundry at $3.50 to $3.70. Prompt furnace is quoted at about $3.65 per net ton and contract at $2.75, upward. Freight rates from the principal producing districts are as follows: Connellsville, $2.05, Latrobe, $1.85, and Mountain, $1.65.

Old Material.—The railroad freight embargoes continue to halt deliveries in several directions. Coatesville is embargoed, also New England and all points east of Trenton on the Pennsylvania Railroad. Embargoes against shipments to Harrisburg and Lebanon have been raised. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$16.50 to $17.00
Old steel rails, rerolling	19.00 to 20.00
Low phos. heavy melting steel scrap	21.50 to 22.50
Old steel axles	25.00 to 26.00
Old iron axles	27.00 to 28.00
Old iron rails	19.50 to 20.00
Old carwheels	16.50 to 17.00
No. 1 railroad wrought	21.50 to 22.00
Wrought-iron pipe	14.75 to 15.25
No. 1 forge fire	14.00 to 14.50
Bundled sheets	14.00 to 14.50
No. 2 busheling	11.00 to 11.50
Machine shop turnings	9.50 to 10.00
Cast borings	11.00 to 11.50
No. 1 cast	17.00 to 18.00
Grate bars, railroad	12.50 to 13.00
Stove plate	13.00 to 13.50
Railroad malleable	15.00 to 15.50

Cleveland

CLEVELAND, OHIO, Feb. 22, 1916.

Iron Ore.—A great deal of stripping work is being done at the open pit mines in the Lake Superior district in preparation for the large production as soon as operations are started in the spring. Dock shipments are somewhat lighter than they were a few weeks ago, due probably to the severe weather. There is no activity in the market. We quote as follows for delievry at lower Lake ports: Old range Bessemer, $4.45; Mesaba Bessemer, $4.20; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.55.

Pig Iron.—A fairly active buying movement in foundry iron for last half delivery has developed in this and surrounding territories. A number of sales in lots up to 1500 tons or larger have been made the past few days and considerable inquiry is pending. When prices eased off in the Valley from the maximum $19 for No. 2 to $18.50, Cleveland makers met the situation with a similar reduction in prices for outside shipment but held to $19 at furnace for Cleveland delivery, this having been the nominal quotation for several weeks past when the market was inactive. Cleveland prices have now been reduced to $18.70 at furnace for No. 2, or $19 delivered, at which a number of sales have been made. In the Valley the market is firm at $18.50, and a Cleveland interest has advanced its Buffalo price to $19. The recent weakening of Southern prices, due to offering of resale iron, has also had some effect on the local price situation. The market on Southern iron is now firmer. A Pittsburgh sanitary interest is in the market for 2000 tons each of No. 2 and 3 Southern iron for second quarter. We note the sale of 1000 tons of Southern charcoal iron for last half delivery in the Pittsburgh district at $23. The Detroit Iron & Steel Company, Detroit, Mich., blew out its A stack this week for relining. We quote, delivered Cleveland, as follows:

Bessemer	$20.95 to $21.45
Basic	18.70 to 19.00
Northern No. 2 foundry	19.00
Southern No. 2 foundry	19.00 to 19.50
Gray forge	18.25
Jackson Co. silvery 8 per cent silicon	26.62
Standard low phos., Valley furnace	32.00

Coke.—The market is firm but inactive. Foundries show no disposition as yet to place contracts for last half. There is still a scarcity of foundry coke for prompt shipment and quotations for best Connellsville makes range from $3.75 to $4.50 per net ton at oven. For last half delivery, $3.75 to $4 is quoted. Virginia foundry coke is offered at $3.75 for last half. Connellsville furnace coke is quoted at $3.50 to $3.75 for prompt shipment.

Finished Iron and Steel.—Inquiries for steel for specific work and contracts is still heavy and consumers continue to crowd the mills for deliveries. The advance to 2.25c., Pittsburgh, for steel bars and structural material and to 2.35c. for plates, made by the Carnegie Steel Company, has been followed by a similar advance by other mills. Very few agricultural implement makers in this territory closed contracts for their last half requirements before the last advance in prices, and those still uncovered will be compelled either to place orders at the present price or take their chance with the market later. The Lima Locomotive Corporation has taken 95 locomotives for the New York Central, 6000 tons of steel for which will be furnished by the Carnegie Steel Company. Four boats placed the last few days with the Lake shipyards will require about 13,500 tons of plates and structural material. The high price of steel is having an effect on building work and not much inquiry is coming out. Bids will be asked for shortly for the new Boody House, Toledo, requiring 3000 to 4000 tons of steel. The local plate market is very active, with prices firm at 2.75c., Cleveland mills. Several price advances were made during the week. Hard steel bars have been advanced to 2.25c. and 2.35c., Pittsburgh; hoops have been advanced to 2.50c. and light rails have been advanced $3 per ton. The sheet market is very firm and active. We quote black sheets at 2.60c. to 2.75c., Ohio mill, for No. 28; blue annealed,

2.60c. to 2.80c. for No. 10; galvanized, 4.75c. to 5c. for No. 28. Sales of forging billets are reported at $55 for early delivery. Bar iron is unchanged at 2.25c., Cleveland. Following the advance in mill prices Cleveland warehouse prices have been advanced $6 per ton. We quote warehouse prices as follows: Steel bars and structural material, 3c.; plates, 3.15c.; round steel bars, 3 in. and larger, and square, 2 in. and larger, 3.50c.; bar iron, 2.95c.; hoops, 3.50c. Warehouse prices on shafting have been advanced to the list price.

Bolts, Nuts and Rivets.—The advance in steel prices has resulted in a further advance in prices, amounting to 10 per cent on bolts and nuts, except cold pressed semi-finished hexagon nuts, and $6 per ton on rivets. We quote rivets at 3c., Pittsburgh, for structural and 3.10c. for boiler rivets for spot shipment only. Leading producers refuse to quote for future delivery. The demand for bolts and nuts is heavy. Many manufacturers are placing contracts for last half. The demand for rivets is also very active. Bolt and nut discounts are as follows:

Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 65 & 5; cut thread, 65; larger or longer, 50 & 15; machine bolts with h.p. nuts, ⅜ x 4 in., smaller and shorter, rolled thread, 65 & 10; cut thread, 65 & 5; larger and longer, 50 & 20; lag bolts, gimlet or cone point, 65, 10 & 5; square h.p. nuts, blank or tapped, $3.70 off the list; hexagon, h.p. nuts blank or tapped, $3.80 off; c.p.c. & t. square nuts, blank or tapped, $3.50 off; hexagon nuts all sizes, $4.25 off; cold pressed semi-finished hexagon nuts, all sizes, 75 & 10 off.

Old Material.—The market is somewhat more active than it has been in the past few weeks. Mills, however, are buying only in a limited way, the bulk of the transactions being between dealers who are covering short sales. Prices generally are fairly well maintained and quotations show very little change. Heavy melting steel is quoted at $17 for Youngstown delivery. Some borings have been sold at $11.35, delivered at Pittsburgh district mills. Turnings are rather weak. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails	$16.50 to $17.00
Old iron rails	19.00
Steel car axles	25.00 to 26.00
Heavy melting steel	15.75 to 16.00
Old carwheels	14.00 to 14.50
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	14.00 to 14.25
Railroad malleable	16.75 to 17.00
Steel axle turnings	13.25 to 13.50
Light bundled sheet scrap	13.25 to 13.50

Per Net Ton

Iron car axles	$23.00 to $24.00
Cast borings	8.50 to 8.75
Iron and steel turnings and drillings	7.50 to 8.00
No. 1 busheling	14.00 to 14.50
No. 1 railroad wrought	17.00 to 17.50
No. 1 cast	13.75 to 14.25
Railroad grate bars	10.50 to 11.00
Stove plate	10.50 to 11.00

St. Louis

ST. LOUIS, MO., Feb. 21, 1916.

Pig Iron.—Heavy inquiry and a considerable number of large transactions, chiefly for second half delivery, mark the week. Sales included 15,000 tons of Southern basic to the Scullin Steel Company for second half delivery; also 1000 tons of Northern basic for second half delivery, and 2000 tons of malleable. Inquiries still outstanding include one of 800 tons of No. 2 Southern, one for 3000 tons of malleable and several of 500, 400 and 300 tons. There is also an inquiry for 300 tons of Bessemer ferrosilicon. Buyers generally seem to feel the necessity for getting in orders at once to protect themselves, and further heavy buying is expected through the week.

Coke.—Prompt delivery coke was at decided premium quotations, sales being made at $4 to $4.50 per net ton for best 72-hr. selected, with deferred deliveries quoted at $3.75 to $4 per ton. Local by-product coke is stiffer than for some time.

Finished Iron and Steel.—Quotations here are now at 2.25c., Pittsburgh, for shapes and bars and 2.35c. for plates, with no real promise as to delivery. In standard section rails the southwestern roads are beginning to put out feelers because of the necessity for placing orders early to get delivery. Movement out of warehouse is very active at the following prices: Soft steel bars, 2.65c.; iron bars, 2.60c.; structural material, 2.65c.; tank plates, 3c.; No. 10 blue annealed sheets, 3c.; No. 28 black sheets, cold rolled, one pass, 3.20c.; No. 28 galvanized sheets, black sheet gage, 5.25c.

Old Material.—The activity in the pig-iron market has brought some strengthening of the scrap market, but practically no change in quoted prices. The opinion is that by the first of the month the consumers will again be taking in material. Relaying rails are in very active demand and still difficult to get. Lists out include 2000 tons from the Burlington and 1000 tons from the Wabash. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$15.25 to $15.75
Old steel rails, rerolling	16.50 to 17.00
Old steel rails, less than 3 ft	16.25 to 16.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	13.25 to 13.75
No. 1 railroad heavy melting steel scrap	14.75 to 15.25
Heavy shoveling steel	13.00 to 13.50
Frogs, switches and guards cut apart	14.75 to 15.25
Bundled sheet scrap	9.75 to 10.25

Per Net Ton

Iron angle bars	$14.75 to $15.25
Steel angle bars	13.00 to 13.50
Iron car axles	19.75 to 20.25
Steel car axles	20.75 to 21.25
Wrought arch bars and transoms	16.75 to 17.25
No. 1 railroad wrought	14.25 to 14.75
No. 2 railroad wrought	13.75 to 14.25
Railroad springs	14.25 to 14.75
Steel couplers and knuckles	14.25 to 14.75
Locomotive tires, 42 in. and over, smooth inside	14.25 to 14.75
No. 1 dealers' forge	11.75 to 12.25
Mixed borings	7.75 to 8.25
No. 1 busheling	12.25 to 12.75
No. 1 boilers, cut to sheets and rings	9.75 to 10.25
No. 1 railroad cast scrap	11.75 to 12.25
Stove plate and light cast scrap	9.25 to 9.75
Railroad malleable	11.25 to 11.75
Agricultural malleable	9.75 to 10.25
Pipes and flues	9.75 to 10.25
Railroad sheet and tank scrap	9.00 to 9.50
Railroad grate bars	9.25 to 9.75
Machine shop turnings	9.25 to 9.75

Birmingham

BIRMINGHAM, ALA., Feb. 21, 1916.

Pig Iron.—The Birmingham district market basis is $15 for spot and first half and $15.50 for second half. Two interests are selling openly on this basis. Higher prices are asked in many instances, but iron can be secured in large quantities at these figures. The leading interest adheres to $15 and $16 for first and second halves and other well sold up manufacturers demand $15.50 for spot and first half and $16 for second, making sales at these figures. There is no evidence of any Birmingham iron going under $15. Tennessee metal in some instances sells under the above prices because the freight differential may be sacrificed. On the other hand, some of the Tennessee stacks are not participating in the sacrifice of differentials. The Sloss-Sheffield Company is moving 1000 tons via barge line on the Tennessee and Mississippi rivers to Metropolis for delivery northward, that business having been inaugurated. The river freight is much under the rail to junction points and reduces the cost of delivery points as much as $1 per ton under the all-rail rate. This iron goes from Sheffield and Florence into extreme northern Alabama. It might and could sell 50c. per ton under Birmingham metal, especially in Chicago territory, where it will most likely figure prominently. The Tennessee Coal, Iron & Railroad Company has directed a vessel laden with manganese ore from Brazil to put in at Mobile, with indications that this port will probably be made its permanent port of entry for this ore. Additional operations on ferromanganese will follow reception of the Brazilian ore. Early action by the Sloss-Sheffield Company on its proposed by-product coke plant at an expenditure of $1,000,000 is indicated as to follow the expected visit here of President Maben. Machine shops of the Birmingham district have not been so busy in years. Their consumption of pig iron in the manufacture of lathes for the Allies, sugar-mill machinery for Cuba and a general line of castings is at a maximum. Test runs on the manufacture of shells for the Allies have been made at the plant of the Anniston Ordnance Company and pronounced satisfactory. The pig-iron

movement continues heavy. The Alabama Demurrage Association reports a total of 77,340 cars moved in January, an increase over January, 1915, of 22,761 cars. The Alabama Company reports sales of its Etowah foundry iron at $15 and $15.50 for first and second halves and $17.50 and $18 for its 3 per cent high silicon Clifton iron. The Woodward Iron Company acknowledges booking busines on the same foundry levels. All makers express confidence in the firmness of the market and look for an early buying movement of some dimensions. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$15.50 to $16.00
No. 2 foundry and soft	15.00 to 15.50
No. 3 foundry	14.50 to 15.00
No. 4 foundry	14.25 to 14.75
Gray forge	14.00 to 14.50
Basic	15.00 to 15.50
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—Additional orders of considerable proportion and the prospect of more early contracts feature the iron pipe trade and have imparted a great deal of buoyancy as well as suggested further strength in quotations. The American and United States companies have booked over 1000 tons each for Milwaukee and Kansas City respectively. The South American business outlook is quite good. We quote, per net ton, f.o.b. makers' yards, as follows: 4-in., $27.50; 6-in. and upward, $25, with $1 added for gas pipe and 16-ft. lengths.

Coal and Coke.—All available beehive ovens are now either in use or nearing that point, yet the coke output has not reached a point where any tonnage lies upon the yards. Advanced prices are easily maintained. Brookwood and Yolande beehive foundry continue to sell at $3.75 and $4 per net ton, f.o.b. yards respectively, while the little furnace coke that is available brings $2.80 to $3. Mexican and Southwestern shipments are regularly made. Domestic coal is easing in demand, but steam coal is holding its own.

Old Material.—Dealers report an increase in the volume of business, with special activity in steel scrap. Prices are firmly maintained. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.00 to 14.50
Old iron rails	13.50 to 14.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.00 to 9.50
No. 1 country wrought	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.00 to 10.50
Tram carwheels	10.00 to 10.50
Stove plate	8.00 to 8.50

Cincinnati

CINCINNATI, OHIO, Feb. 21, 1916.

Pig Iron.—The situation has changed almost over night. Numerous general inquiries for foundry iron in hand and considerable interest is also being taken in both basic and malleable. A nearby rolling mill is inquiring for 10,000 tons of basic for last half shipment and another basic consumer in this vicinity is quietly negotiating for an additional last half supply. Southern prices on foundry iron are firmer and $15, Birmingham basis, for last half shipment is minimum on furnace iron to-day, while it is doubtful if much resale iron could be obtained below this price. Last half quotations are about 50c. per ton higher. Among sales reported is one including 2000 tons of Northern foundry and 1000 tons of Southern foundry to a central Ohio melter for last half delivery. An Indiana consumer also took approximately 1500 tons of mixed Northern and Southern foundry grades. The Ohio silvery irons have again been active and several sales were made in Michigan, the largest of which was 600 tons for July-December shipment. In the same territory 1000 tons of malleable and 1000 tons of Lake Superior charcoal foundry iron were sold. Inquiries include one from central Ohio for 1000 tons of Northern iron, another for 2500 tons of mixed Southern and Northern grades from southern Ohio, and there are several for both large and small lots from Indiana and southern Illinois. A central Ohio buyer is expected to close this week for 1500 tons of malleable. Northern foundry, malleable and basic are very firm at $18, Ironton, for any shipment this year. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$18.40 to $18.90
Southern coke, No. 2 f'dry and 2 soft	17.90 to 18.40
Southern coke, No. 3 foundry	17.40 to 17.90
Southern No. 4 foundry	16.90 to 17.40
Southern gray forge	16.40 to 16.90
Ohio silvery, 8 per cent silicon	26.26 to 26.76
Southern Ohio coke, No. 1	20.26 to 20.76
Southern Ohio coke, No. 2	19.26 to 19.76
Southern Ohio coke, No. 3	18.76 to 19.26
Southern Ohio malleable Bessemer	19.26 to 19.76
Basic, Northern	19.26 to 19.76
Lake Superior charcoal	21.20 to 22.20
Standard Southern carwheel	25.40 to 25.90

Coke.—The shortage of cars in the Connellsville region is still a serious matter, labor is also scarce and weather conditions have not been without some influence on the prompt shipment market. For 48-hr. coke loaded on cars as high as $3.75 per net ton at oven can be obtained, but contract figures run as low as $2.25. Prompt foundry coke is quoted the same as furnace, with contract figures ranging from $3.25 to $3.60. More interest is being taken in foundry coke and some fair sized tonnages have been placed lately. Wise County and Pocahontas furnace coke is unchanged around $2.50 to $2.90 at oven and foundry coke from $3.25 to $3.75.

Finished Material.—Business continues to improve and prices are firmer. A further advance all along the line is scheduled to take place before March 1. It is an impossible proposition to get quick mill shipment except on old contracts, but warehouse stocks are taking care of the demand in a fairly satisfactory way. We quote No. 28 galvanized sheets from jobbers' stocks at 5.15c., Cincinnati. The mill price is also 5.15c., Cincinnati, or Newport, Ky. No. 28 black sheets are now advanced to 2.80c. Jobbers are still taking orders for wire nails at $2.30 per keg base and barb-wire at $3.20 per 100 lb., but are considering advancing quotations this week. Steel bars from stocks are 2.70c.; No. 10 blue annealed sheets, 3.10c.; plates, ¼-in. and over, 2.90c.; rounds, 2-in. and over, 3.20c., base; flats, 2-in. thick and over, 2.95c.; twisted steel bars, 2.90c., and structural shapes, 2.80c.

Old Material.—Prices on all grades of scrap are soft and while no general change has been made it is probable that some could be purchased below the figures given. Yard stocks are increasing at a slow but steady rate. The minimum prices given below represent what dealers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards.

Per Gross Ton

Bundled sheet scrap	$10.25 to $10.75
Old iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up	20.50 to 21.00
Rerolling steel rails	13.75 to 14.75
Heavy melting steel scrap	13.75 to 14.25
Steel rails for melting	13.50 to 14.50

Per Net Ton

No. 1 railroad wrought	$13.00 to $13.50
Cast borings	7.00 to 7.50
Steel turnings	6.75 to 7.25
Railroad cast scrap	11.25 to 11.50
No. 1 machinery scrap	13.00 to 13.50
Burnt scrap	8.25 to 8.75
Iron axles	18.75 to 19.25
Locomotive tires (smooth inside)	12.75 to 13.25
Pipes and flues	9.75 to 10.25
Malleable and steel scrap	10.25 to 10.75
Railroad tank and sheet scrap	8.25 to 8.75

Buffalo

BUFFALO, N. Y., Feb. 22, 1916.

Pig Iron.—Although no general buying is reported, there is a fairly active market, the principal business being in small tonnage lots. The aggregate of sales for the week amounted to between 25,000 and 30,000 tons, of all grades; little by little the foundries in this vicinity are climbing up in output to their maximum capacity. The price situation shows further tendency toward hardening. We continue to quote last week's prices, however, as follows, f.o.b. furnace, Buffalo, for current and last half delivery:

No. 1 foundry	$19.00 to $19.50
No. 2 X foundry	18.75 to 19.00
No. 2 plain	18.50 to 18.75
No. 3 foundry	18.50
Gray forge	18.50
Malleable	19.00 to 19.50
Basic	19.00 to 20.00
Charcoal, regular brands and analysis	21.00 to 22.00

Finished Iron and Steel.—The advance of $5 per ton announced by the Carnegie Steel Company Friday on bars, plates and shapes has been followed by the other manufacturers, making bars and shapes 2.25c. and plates 2.35c. base, Pittsburgh. This advance does not materially change the situation, however, for the sales agencies are still unable to take on tonnage because of the sold-up condition of the mills. The mills have apparently adopted the policy of getting out old contract tonnage before obligating themselves further on new tonnage. Pressure exerted by users not protected for the last half is stronger than at any time since the buying movement started; but mills are turning down offerings of desirable tonnage, even at premium prices, and will not consider orders from new customers, preferring to save what untaken tonnage they have for their regular customers. Mills are not taking any business for specific delivery during last half, but simply accepting specifications on existing contracts for delivery in turn as they are received and at mill's convenience in the latter part of 1916 and early in 1917. Warehouse prices have also been advanced $5 per ton, making steel bars 2.95c., f.o.b. Buffalo, except for large rounds and squares 2 in. and over, which are 3.65c. base; structural shapes 2.95c.; plates 3.45c. and hoops 3.55c.; all subject to 5c. per 100 lb. additional for store-door delivery. Notwithstanding the large increase in prices, orders are coming in in increasingly large volume. The American Rolling Mill Company is to supply 250 tons of Armco iron corrugated sheets for roofing, siding, etc., for the new mills to be erected by the Wickwire Steel Company. The Lackawanna Bridge Company, Buffalo, has the 3200 tons of fabricated steel. This company has also the contract for 3000 tons for elevated structure for the West End Traction Company at Cincinnati and for 200 tons for railroad bridge work over the Erie Canal at the Niagara River.

Old Material.—Demand remains good for most lines of scrap, with several inquiries out for large tonnages of heavy melting steel. Some consumers who have been out of the market for a short time are coming in with fresh inquiries and feeling out the market. There are no changes in prices to report from those prevailing a week ago. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$16.50 to $17.00
Low phosphorus steel	21.00 to 21.50
No. 1 railroad wrought scrap	19.00 to 19.50
No. 1 railroad and machinery cast, scrap	16.00 to 16.50
Old steel axles	24.00 to 24.50
Old iron axles	24.00 to 24.50
Old carwheels	15.25 to 15.75
Railroad malleable	15.25 to 15.75
Machine shop turnings	7.75 to 8.25
Heavy axle turnings	12.00 to 12.50
Clean cast borings	9.25 to 9.75
Old iron rails	17.50 to 18.00
Locomotive grate bars	11.50 to 12.00
Stove plate (net ton)	11.00 to 11.50
Wrought pipe	13.00 to 13.50
Bundled sheet scrap	12.00 to 12.50
No. 1 busheling scrap	14.50 to 15.00
No. 2 busheling scrap	11.00 to 11.50
Bundled tin scrap	15.00 to 15.50

British Steel Market Firm

American Billets Higher—Ferromanganese Advanced—Collapse in Warrants

(By Cable)

LONDON, ENGLAND, Feb. 23, 1916.

Steel-making pig iron is stronger owing to increased shortage. Hematite iron is firm at 140s. and upward for shipment up to June, while small lots for third quarter delivery have sold at 137s. 6d. Inquiry for semi-finished steel is good and consumers in need are paying pretty stiff premiums for early supplies. Warrants collapsed on government decision that Cleveland makers must supply some trade at 82s. 6d.

American Bessemer billets for March shipment have sold for £11 5s. and American open-hearth billets for April and May delivery at £11 2s. 6d. English billets for February and March delivery have been done at £12 7s. 6d., delivered. American open-hearth billets are obtainable at $50 c.i.f. Ferromanganese for American consumption has been advanced to $150. Welsh bars have sold at £12 10s. Prices of a few commodities mostly nominal are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 25s. 6d.

Cleveland pig-iron warrants, 85s. 9d., London, and 89s. 6d., Glasgow, as compared with 96s. 6d. last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £19.

Steel ship plates, Scotch, delivered local yards, £13 5s.

Steel rails, export, f.o.b. works port, £11.

Hematite pig iron, f.o.b. Tees, about 135s.

Sheet bars (Welsh) delivered at works in Swansea Valley, £12 5s.

Ferromanganese, f.o.b. $150.

Ferrosilicon, 50 per cent, c.i.f., £27.

New York

NEW YORK, Feb. 23, 1916.

Pig Iron.—There is more activity. Sales in the past week, while few were large, were numerous and aggregate from 20,000 to 25,000 tons, the largest being two lots of 5000 tons each, and mostly foundry iron. Pipe foundries have figured in these sales, and the Singer Mfg. Company has bought 8000 to 10,000 tons of foundry iron. About 500 tons of high manganese malleable iron was sold to a New Jersey foundry. Sales in general were on the basis of the recent quotations, though there have been some concessions. Inquiries from many sources are reported, one of considerable proportions from a New England malleable interest. On iron for the second half, $18, Buffalo, has been quoted for No. 2 plain, or the equivalent of $18.50 for No. 2 X. One or two interests, however, are adhering to $19 for No. 2 X. Iron has been sold at $20 delivered in New Jersey, which would figure back to slightly under $18, Buffalo, for 2 X. Not so much is heard regarding the embargoes, and deliveries are easing in the New England territory. The Pennsylvania Railroad lifted its embargo on coke on Monday. We quote at tidewater as follows for early delivery: No. 1 foundry, $20.25 to $20.75; No. 2 X, $19.75 to $20; No. 2 plain, $19.25 to $19.50; Southern iron at tidewater, $20 to $20.50 for No. 1 and $19.50 to $20 for No. 2 foundry and No. 2 soft.

Structural Material.—Inquiries and other signs of activity are noted by architects and builders, and in spite of high prices the total aggregate movement of individually small jobs is expected to be large enough to prevent mills catching up on plain material deliveries. It is difficult to secure much in less than eight or ten weeks or to buy at less than 2.25c., Pittsburgh base, for any delivery. In short, since the last report relatively near-by shipments come $3 per ton higher and third-quarter buying is now at a $5 higher level than last week. No new projects of size are noted and consummations of definite steel building contracts are for the moment generally unimportant. We quote mill shipments at 2.419c., New York, and buying out of store, which is also $5 per ton higher, at 2.95c., New York.

Steel Plates.—Future delivery material is now $5 per ton higher, or 2.35c., Pittsburgh; warehouse prices have had a like advance since last week's report, and only the most attractive offerings from the mill standpoint can secure less than 3c., Pittsburgh, for early shipment. Upward of 3000 tons for delivery in the last five months of the year have indeed been contracted for at 3c. For quite prompt shipment 3.15c., Pittsburgh, has been quoted, and one eastern Pennsylvania mill is regularly naming 3.25c. We quote plates in six weeks at 3.169c., New York; in the latter half of the year at 2.519c., New York; and out of warehouse at 3.50c., New York.

Iron and Steel Bars.—Mill shipments of iron and steel bars are on a parity as to price, but steel bars are obtainable only for future deliveries while iron is obtainable in, say, six weeks and is used whenever possible. Bolts and nuts have had a 10 per cent advance on the average, and shafting is in such demand, and for

other than power transmission purposes, that it has sold from warehouse not only at list but at a premium. We quote steel bars nominally at 2.669c., New York, for early shipment, and at 2.419c., New York, for last half shipment. We quote iron bars at 2.419c., New York. Out of store we quote iron and steel bars at 2.95c., New York.

Ferroalloys.—Inquiries for ferromanganese for last half delivery continue to pile up and aggregate 8000 to 10,000 tons. These are referred to British producers, subject to cable confirmation before sales are made, but not much has been accepted, most makers being well sold up. The opinion prevails that these inquiries may cause a further advance in the price from $150, the present quotation, to $175, seaboard. Anxiety on the part of some consumers is growing, one stating that he will have to shut down unless manganese metal can be obtained soon. This situation is believed to represent principally some of the smaller users. Receipts from England are apparently equal to those of recent months and it is known that in January they were not less than 5300 tons, nearly all delivered on contract. Advices have lately reached this side that some of the future shipments may have to be curtailed partially because of manganese ore shortage or shipping difficulties. Spiegeleisen is very active and several thousand tons are understood to have been sold the past week at $45, furnace, for last half delivery. This is now the quotation, an advance of $5 over last week's, or $10 in the past two weeks. Ferrosilicon, 50 per cent, is scarce with the demand unabated and some consumers very anxious as to their supplies.

Cast-Iron Pipe.—North Collins, N. Y., opened bids to-day on six miles of 4, 6 and 8 in. No other municipal lettings are announced. Private buying is still of good volume. Pipe founders are crowded with work on small sizes of pipe, and some of them may be unable to promise deliveries inside of three or four months. Prices are firm. Carload lots of 6-in., class B and heavier, are quoted at $29.50 per net ton, tidewater, class A and gas pipe taking an extra of $1 per ton.

Old Material.—The market continues quiet as to steel scrap and rolling-mill stock. The price of steel scrap is firm but rolling-mill grades are soft, though not quotably lower. Export inquiries for heavy melting steel scrap are making their appearance, one calling for 5000 tons. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

No. 1 heavy melting steel scrap	$14.00 to $14.50
Relaying rails	23.50
Rerolling rails	15.00 to 15.50
Iron car axles	25.00 to 25.50
Steel car axles	24.00 to 24.50
No. 1 railroad wrought	19.50 to 20.00
Wrought-iron track scrap	17.00 to 17.50
No. 1 yard wrought, long	15.50 to 16.00
No. 1 yard wrought, short	14.00 to 14.50
Light iron	6.50 to 6.75
Cast borings	8.50 to 8.75
Wrought turnings	7.50 to 7.75
Mixed borings and turnings	6.50 to 6.75
Wrought pipe	13.25 to 13.50
Old carwheels	14.00 to 14.50
Malleable cast (railroad)	12.50 to 13.00

The demand from foundries keeps up well. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery)	$17.00 to $17.50
No. 2 cast (heavy)	16.00 to 16.50
Stove plate	12.00 to 12.50
Locomotive grate bars	12.00 to 12.50

The Packard Motor Car Company, Detroit, Mich., states that with the completion of two buildings, scheduled to be ready for use by March 1, its extensive construction program, which has been in progress for the past year, will be finished. The two new buildings will be devoted to the construction of inclosed bodies. The floor space, including these buildings, is now 54 acres. There are 49 buildings. The factory site is a mile long and approximately 1000 ft. wide.

The annual meeting of the American Railway Engineering Association will be held at Chicago, March 21-23, and in the same week the National Railway Appliances Association will, as usual, conduct its annual exhibit at the Coliseum.

Iron and Industrial Stocks

NEW YORK, Feb. 23, 1916.

The stock market has been quite dull and fluctuations have been insignificant, except in the case of two or three stocks which have been influenced by special causes. The range of prices on active iron and industrial stocks from Wednesday of last week to Monday of this week was as follows:

Allis-Chal., com.	30 - 30¾	Sloss, com.	57 - 57⅞
Allis-Chal., pref.	80¾ - 82¼	Sloss, pref.	98
Am. Can, com.	61½ - 63½	Pipe, com.	18 - 19
Am. Can, pref.	111	Pipe, pref.	49⅞
Am. Car & Fdy., com.	69⅛ - 71¼	U. S. Steel, com.	82½ - 84⅛
Am. Car & Fdy., pref.	118	U. S. Steel, pref.	116½ - 117⅛
Am. Loco., com.	65 - 66⅜	Va. I. C. & Coke	54⅞
Am. Loco., pref.	102 - 102⅜	Westg. Electric	65⅞ - 67⅝
Am. Steel Fdries.	54½ - 57	Am. Rad., com	395
Bald. Loco., com.	107 - 112½	Am. Rad., pref.	134
Bald. Loco., pref.	109 - 110	Am. Ship, com.	38 - 40
Beth. Steel, com.	468¾ - 480	Am. Ship, pref.	80⅞ - 85
Case (J. I.), pref.	85⅞	Chic. Pneu. Tool.	71½ - 73½
Colorado Fuel	44⅝ - 46	Cambria Steel	80⅞ - 81¼
Gen. Electric	169 - 171¾	Lake Sup. Corp.	10½ - 12
Gt. No. Ore Cert.	44¾ - 46	Pa. Steel, com.	75 - 90¼
Int. Harv. of N. J., com.	110¼ - 110½	Pa. Steel, pref.	95½ - 99½
Int. Harv. Corp., com.	70	Warwick	16½
Lackawanna Stl.	76¾ - 78	Cruc. Steel, com.	78¾ - 82⅝
Nat. En. & Stm., com.	26 - 26¾	Cruc. Steel, pref.	112 - 113½
Nat. En. & Stm., pref.	97½	Harb-Walk. Refrac., com.	83 - 83½
N. Y. Air Brake.	143 - 150	Harb-Walk. Refrac., pref.	102
Pitts. Steel, pref.	93¾ - 94½	La Belle Iron, com.	50¾ - 51
Pressed Stl., com.	55 - 58	La Belle Iron, pref.	124 - 125
Pressed Stl., pref.	103	Can. Car & Fdy., com.	65
Ry. Stl., Spring, com.	40½ - 42	Can. Car & Fdy., pref.	85
Ry. Stl., Spring, pref.	98 - 98½	Driggs-Seabury	140 - 144
Republic, com.	52¼ - 53⅞	Midvale Steel	67¾ - 71½
Republic, pref.	110 - 111		

Dividends

The Empire Steel & Iron Company 2 per cent on the preferred stock, payable March 1. The last payment on the shares was 2 per cent on Jan. 1, 1913.

The Dominion Steel Foundries, Ltd., quarterly, 2 per cent payable March 1.

The Gulf States Steel Company, quarterly, 1¾ per cent on the first preferred stock, payable April 1.

The New York Air Brake Company, quarterly, 2 per cent, payable March 23, placing the stock on an 8 per cent per annum basis. The last disbursement was 1½ per cent on Dec. 23.

The Republic Iron & Steel Company, regular quarterly, 1¾ per cent on the preferred stock and 1 per cent to apply on accrued dividends, payable April 1.

The National Lead Company, quarterly, 1 per cent on the common stock, payable March 31, placing the stock on a 4 per cent basis.

British Pig-Iron Output in 1914

British pig-iron production in 1914, according to the Annual Report on Mines and Quarries, just issued, was 8,923,773 gross tons. Ores used were of British and foreign origin. The 1913 output was 10,260,315 tons. The iron ore used, including cinder, was 22,470,749 tons in 1914 and 25,707,518 tons in 1913. The exports of pig iron in 1914 were 782,349 tons, leaving 8,141,424 tons available for consumption.

The British iron-ore output in 1914 was 14,867,582 gross tons compared with 15,997,328 tons in 1913. Including imports and deducting exports the total ore available for furnaces in 1914 was 21,153,469 tons against 24,019,482 tons in 1913. The pig iron obtainable from the output of British ore in 1914 is put at 4,786,090 tons as against 5,138,958 tons in 1913.

It is announced by the Scherzer Rolling Lift Bridge Company, Monadnock Block, Chicago, that following the death of Albert H. Scherzer, president, the entire stock of the company has been purchased by a syndicate of its officials who have been connected with the business from its inception and that there will be no change in the personnel of the organization. Mr. Scherzer had taken no active part in the affairs of the company for several years.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.; New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 73.9c. on plates, structural shapes and sheets and 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal is 56.9c.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 2.25c. to 2.50c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 2.35c. to 2.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3/16 in. take the price of 3/16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under ¼ in. to and including 3/16 in.	.10
Gages under 3/16 in. to and including No. 8	.15
Gages under No. 8 to and including No. 9	.25
Gages under No. 9 to and including No. 10	.30
Gages under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods.—Bessemer, open-hearth and chain rods, $50 to $52, nominally.

Wire Products.—Prices to jobbers, effective Feb. 14: Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, $2.15; galvanized, $2.85. Galvanized barb wire and staples, $3.15; painted, $2.45. Wire nails, $2.30. Galvanized nails, 1 in. and longer, $2 advance over base price; shorter than 1 in., $2.50 advance over base price. Woven wire fencing, 63½ per cent off list for carloads, 62½ off for 1000-rod lots, 61½ off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$2.20	$2.25	$2.30	$2.35	$2.50	$2.60	$2.70	$2.80
Galvanized	3.10	3.15	3.20	3.25	3.30	3.45	3.80	3.90

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Feb. 15, 1916, on iron and steel black and galvanized pipe, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	68	42½	¼ and ⅜	57	31
½	72	55½	⅝	58	32
¾ to 3	75	59½	½	62	42
			¾ to 1½	65	47
			2	64	46

Lap Weld

2	72	56½	1¼	49	31
2½ to 6	74	58½	1½	60	42
7 to 12	70	53½	2	61	44
13 and 14	60½	..	2½ to 4	63	47
15	58	..	4½ to 6	63	47
			7 to 12	61	45

Reamed and Drifted

1 to 3, butt	73	57½	1 to 1½, butt	63	45
2, lap	70	54½	2, butt	62	44
2½ to 6, lap	72	56½	1¼, lap	47	29
			1½, lap	58	40
			2, lap	59	42
			2½ to 4, lap	61	45

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	64	47½	⅜	56	39
½	69	56½	½	61	47
¾ to 1½	73	60½	¾ to 1½	65	49
2 to 3	74	61½	2 and 2½	65	49

Lap Weld, extra strong, plain ends

2	70	55½	1½	59	43
2½ to 4	72	57½	2	62	45
4½ to 6	71	56½	2½ to 4	64	48
7 to 8	66	49½	4½ to 6	63	47
9 to 12	61	44½	7 to 8	56	40
			9 to 12	51	35

Butt Weld, double extra strong, plain ends

½	60	47½	½	51	36
¾ to 1½	63	50½	¾ to 1½	54	39
2 to 2½	65	52½	2 and 2½	55	40

Lap Weld, double extra strong, plain ends

2	61	48½	2	52	36
2½ to 4	63	50½	2½ to 4	54	41
4½ to 6	62	49½	4½ to 6	52	39
7 to 8	56	39½	7 to 8	45	29

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Sheets.—Makers' prices for mill shipment on sheets, of U. S. standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	2.60 to 2.75
Nos. 9 to 10	2.65 to 2.80
Nos. 11 and 12	2.70 to 2.85
Nos. 13 and 14	2.75 to 2.90
Nos. 15 and 16	2.85 to 3.00

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Box Annealed Sheets, Cold Rolled

Nos. 17 to 21	2.40
Nos. 22 and 24	2.45
Nos. 25 and 26	2.50
No. 27	2.55
No. 28	2.60
No. 29	2.65
No. 30	2.75

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Galvanized Sheets of Black Sheet Gage

Nos. 10 and 11	3.75 to 4.00
No. 12	3.85 to 4.10
Nos. 13 and 14	3.85 to 4.10
Nos. 15 and 16	3.95 to 4.20
Nos. 17 to 21	4.10 to 4.35
Nos. 22 and 24	4.30 to 4.55
Nos. 25 and 26	4.45 to 4.70
No. 27	4.60 to 4.85
No. 28	4.75 to 5.00
No. 29	4.90 to 5.15

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, on lap-welded steel tubes, in effect from Jan. 14, 1916, and standard charcoal-iron tubes, effective from Jan. 20, 1916, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1½ in.	43	1½ in.	38 to 39
1¾ and 2 in.	55	1¾ and 2 in.	42 to 43
2¼ in.	52	2¼ in.	39 to 40
2½ and 2¾ in.	58	2½ and 2¾ in.	46 to 47
3 and 3½ in.	63	3 and 3¼ in.	50 to 51
3½ to 4½ in.	64	3½ to 4½ in.	52 to 53
5 and 6 in.	57	5 and 6 in.	46 to 47
7 to 13 in.	54		

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper		Tin,	Lead		Spelter	
		Electro-	New	New	St.	New	St.
Feb.	Lake	lytic	York	York	Louis	York	Louis
16	27.37½	27.25	42.25	6.30	6.22½	20.50	20.25
17	27.37½	27.25	42.12½	6.30	6.22½	21.00	20.75
18	27.37½	27.25	42.20	6.30	6.22½	21.50	21.25
19	27.37½	27.25	42.20	6.30	6.22½	21.50	21.25
21	27.37½	27.25	42.20	6.30	6.22½	21.50	21.25

NEW YORK, Feb. 23, 1916.

Copper has been quieter but its strength is unimpaired. Not much has been done in tin and its quotation is but little changed. Lead is extremely strong at an advance of $1 per ton. Spelter is higher under good demand, chiefly for the choicer grades. Nearby antimony continues scarce and the market is a little higher.

New York

Copper.—The week has been relatively quiet, largely because of the holiday yesterday. The actual market continues to be in June and later deliveries. The quotations for June and July electrolytic range from 27.25c., cash, New York, to 28c. For later than July 26.50c. is quoted. Lake is held at about ⅛c. higher. Prompt deliveries of electrolytic are quotable at 28.50c. to 29c. and sales have been made at over 29c. Manufacturers in some sections of the country whose contracts are expiring, are complaining over the existing situation. Some of their competitors are getting copper under contracts whch still have some time to run, and, as a consequence, those in the first class find that they are being underbid and their customers are being taken away from them. The trade has been interested in a strike at the mills of the American Brass Company at Ansonia, Conn., regarding it as a possible weakening influence on the market; but concessions have been made and the indications are that the strike will soon be ended. The exports this month, including Monday, totaled 12,778 tons.

Tin.—Since the last report the market has been quiet. Advices from abroad are to the effect that there is growing difficulty in getting permits to ship tin, and, because of this, sellers here have been unwilling to part with large quantities of early delivery metal. They realize that if they do they may have difficulty in covering their commitments. The quotation Monday was firm at 42.20c. The arrivals this month up to Monday total 3617 tons and there was afloat on that day 5093 tons. It is understood that the American Smelting & Refining Company will soon have tin smelted from Bolivian concentrates on the market.

Lead.—As was expected, the leading interest advanced its quotations Feb. 16, making the New York price 6.30c. and that at St. Louis 6.22½c. The trade was greatly surprised when an advance of only $1 per ton was announced. The independents are sold up to May, and where they take export business are getting a premium of about $4 per ton. The situation in lead is steadily becoming more like that which prevails in copper, despite the fact that some of the leading producers show a disposition to check the advancing market. The exports this month, including Monday, total 4309 tons.

Spelter.—Under a good demand, especially for the higher grades, prime Western has advanced to 21.50c. to 22c., New York, and 21.25c. to 21.75c., St. Louis, and this despite the fact that the galvanizers have not been heavy buyers; in fact, some of them are temporarily out of business so far as galvanized products are concerned. A case of this kind is a manufacturer of galvanized shingles who is now making a painted metal shingle. A good deal of spelter which was formerly sold as prime Western is now being refined into grades suitable for brass. The exports this month, including Feb. 21, total 2145 tons.

Antimony.—Canadian munitions makers have been large purchasers in the past few days and the price of spot is stronger at 44c. to 45c., duty paid, for Chinese and Japanese grades. March is quoted at 34c. in bond and April at 33½c. The market is made stronger by the continued scarcity of nearby metal.

Old Metals.—The market is firm. Dealers' selling prices are unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	25.00 to 26.00
Copper, heavy and wire	24.00 to 25.00
Copper, light and bottoms	20.00 to 21.00
Brass, heavy	15.00 to 15.50
Brass, light	12.50 to 13.00
Heavy machine composition	18.00 to 19.00
No. 1 yellow rod brass turnings	16.00 to 16.50
No. 1 red brass or composition turnings	16.00 to 17.00
Lead, heavy	5.75
Lead, tea	5.25
Zinc	14.00 to 15.00

Chicago

FEB. 21.—Heavy buying of metals continued through last week, but for the time being prices appear to have found a level. We quote: Casting copper, 27.50c.; Lake copper, 28.50c.; tin, carloads, 42.50c.; and small lots, 44.50c.; lead, 6.25c.; spelter, 21c.; sheet zinc, 25c.; Cookson's antimony, 50c.; other grades, 46c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 22c.; copper bottoms, 20c.; copper clips, 21c.; red brass 18.50c.; yellow brass, 16c.; lead pipe, 6c.; zinc, 14.75c.; pewter, No. 1, 26c.; tinfoil, 35c.; block tin pipe, 38c.

St. Louis

FEB. 21.—Metals have moved up again, with the close to-day as follows: Lead, 6.50c.; spelter, 21.50c.; tin, 45c.; Lake copper, 28.50c.; electrolytic copper, 28.25c.; antimony, 46c. In the Joplin mining district there was a sharp movement upward in ore prices, and the top quotation for zinc blende, 60 per cent metal, was $130 per ton, with the settlement on choicest ores at $136; calamine, at $90 for the best grades, with the range downward on less desirable ore to $75; lead, $87, basis of 80 per cent metal. The average for the week's production in the district was: Zinc blende, $112; calamine, $87; lead, $84. Miscellaneous scrap metals are quoted as follows: Light brass, 10c.; heavy yellow brass, 13c.; heavy red brass and light copper, 15c.; heavy copper and copper wire, 18c.; pewter, 22c.; tinfoil, 32c.; zinc, 10c.; lead, 5c.; tea lead, 3.50c.

Record Exports of Babbitt Metal

Exports of babbitt metal from the United States are the greatest recorded, the average for September, October and November, 1915, being 208,017 lb. per month, or at the rate of 2,496,204 lb. per year. Comparative Government figures are as follows:

	Pounds	Pounds per Month
September, 1915	220,749	
October, 1915	271,569	208,017
November, 1915	131,735	
11 months ended Nov. 30, 1915	1,066,391	96,944
Fiscal year ended June 30, 1914	1,010,651	84,221
Fiscal year ended June 30, 1911	1,548,859	129,071

These expanding exports represent large quantities of antimony, tin and lead, as well as some copper and zinc, depending on the composition of the alloy, which varies greatly.

Record Copper Production in 1915

The production of refined copper in the United States in 1915 was 1,652,775,822 lb. according to the estimates of the *Engineering and Mining Journal*. The stock on hand Dec. 31, 1915, was 84,666,380 lb., against 162,566,683 lb. on Dec. 31, 1914. Several producers reported that all of their refined copper, at works or in warehouses was disposed of and simply awaited shipping opportunities. In 1914 the production was 1,533,781,394 lb. according to the U. S. Geological Survey and for 1913 it was estimated by the Copper Producers Association at 1,622,450,829 lb.

A Philippine Iron Ore Similar to the Cuban Mayari Ores

Discussing "The Iron-Ore Deposits of the Philippine Islands," Wallace E. Pratt, chief of the Division of Mines, Bureau of Science, Manila, P. I., in a paper presented at the February meeting of the American Institute of Mining Engineers, states that on the eastern coast of Surigoa province in Mindanao, there is an area of about 40 square miles, bordering the sea for a distance of 10 miles, which in 1914 was found to be covered with laterite rich enough in iron to constitute an ore.

In summarizing the data obtained the author states that the ore deposit and the ore itself are strikingly similar to the lateritic iron ores of the Mayari district of Cuba and that:

> From the weight of a unit volume of the ore in place it can be calculated that the total economically important metric tonnage is 430,000,000, of which about 375,000,000 tons is contained in that part of the ore mantle which is 10 ft. or more in thickness. Reasonably accessible from the coast, but divided into a number of separate deposits by precipitous valleys, there is 275,000,000 tons of ore, with 260,000,000 tons lying 10 ft. or more deep. Finally, within two areas of ore which could be mined from a base at Dahikan Bay, the most feasible harbor site, there is 138,000,000 tons, 130,000,000 tons of which is more than 10 ft. thick. It should be noted, however, that the bulk of even this most favorably situated ore lies on the tops of hills and broad divides from 400 to 1000 ft. above sea level and that within each of the two areas near Dahikan Bay there are ravines and denuded slopes which would of necessity be avoided in mining.

Recovery of Brass from Founders' Scrap

To reclaim metallic brass from foundry and manufacturing plant scrap by grinding the mixture so that the slag and coal become fine enough to pass through a fine screen has been made the subject of a study which was contributed to the meeting in New York of the American Institute of Mining Engineers on Feb. 15. The work was done as a series of experiments by Arthur F. Taggart and R. W. Young of the Hammond Mining and Metallurgical Laboratory, Sheffield Scientific School, Yale University.

For grinding they used a special conical ball mill, built by the Hardinge Conical Mill Company. They found that when the dirty brass concentrate containing the slag and a little coal is fed at the rate of 1 ton per hour, a great part will pass through a 1.651-mm. screen while the brass will be only slightly reduced in size and can be separated from the dirt by screening. The screening can be performed by attaching a trommel to the discharge end of the mill. The experiment indicated also that if the feed to the mill contains a considerale percentage of coal, the product that stays on the screen will contain more than 10 per cent "dirt."

Another electrical business campaign has been started by the Society for Electrical Development, Inc., 29 West Thirty-ninth Street, New York. It appears that there are approximately 1,900,000 homes in this country adjacent to electric central station lines but not wired for electric service, and as it is estimated that the annual income from the smaller residence customer amounts to $12 per year, it is figured that there is a minimum of $22,800,000 additional possible business per annum obtainable along existing lines. Accordingly, the movement has been started to get the manufacturers, central station interests, jobbers, contractors and dealers busy to push a "wire your home" month from March 15 to April 15.

The American Society of Civil Engineers is considering joining with the other leading engineering societies in the conduct of the Engineering Societies Building, New York. The members are now voting on a number of propositions, one of which involves an expenditure of $225,000 to $250,000 by the society, this to go toward adding three stories to the present 13-story building.

A. C. Dinkey President of Cambria

At a meeting of the board of directors of the Cambria Steel Company held at Philadelphia, Wednesday afternoon, Feb. 23, a number of members of the board presented their resignations and representatives of the Midvale Steel & Ordnance Company interests were elected in their places, so that the board is now constituted as follows: W. P. Barba, John C. Neale, S. M. Vauclain, A. C. Dinkey, E. E. Slick, W. B. Dickson, Powell Stackhouse, W. E. Corey and Herbert S. Black. W. H. Donner resigned as president of the company and A. C. Dinkey was elected as his successor. No other changes in officers were made.

The Midvale Steel & Ordnance Company announced at the same time that it had taken over and paid for a majority of the shares of the Cambria Steel Company. The time for deposit of shares with Drexel & Co. for purchase at $81 expired on Feb. 19, but on the representation of Messrs. Donner, Stotesbury and Replogle that many shareholders had been unable within the stipulated period to present their shares to Drexel & Co., an extension of time will be made to accommodate them.

Pennsylvania Safety Regulations

The Industrial Board of the Pennsylvania Department of Labor and Industry has recommended an effective system of self-oiling for all bearings, and has forbidden the oiling of shafting by hand while it is in operation. A bulletin which has been issued on this subject says:

> The object of the Industrial Board is to discourage as far as possible the dangerous practice of having an oiler go over the shafting at frequent intervals. Shafting is nearly always located overhead, so that the bearings must be reached from either a platform or ladder. They are frequently in dark and inaccessible positions, so that the oiler cannot properly gage the danger to which he is subjected. In many cases a slip on the part of the oiler himself or his ladder will throw him against a nearby pulley or on the revolving shaft. The result is almost certain death. Loose clothing may be caught up with equally fatal results.
>
> Self-oiling bearings, if properly installed, need but infrequent attention, and can be taken care of at the convenience of the management when the shafting is shut down for other reasons. They therefore remove this hazard absolutely.

The board has also issued a safety standard regulating the use and construction of ladders. Use of broken or weak ladders or ladders with missing rungs is prohibited. Every ladder used about any industrial plant must be numbered or similarly designated and regularly inspected. Ladders in the use of municipal fire departments and the household step ladder are excepted.

Germany's Tungsten Supply

As indicating Germany's position as to supplies of tungsten when the war started the following table, based on the mineral statistics of the empire, is interesting, there being three mines from which the ore is taken in large quantities and imports by no means small also. Weights are in metric tons:

	1909	1910	1911	1912	1913
Mined in Germany	7,865	5,756	5,476	1,927	5,053
Imports	2,520	2,491	3,744	4,534	4,783
Total	10,385	8,247	9,220	6,461	9,836
Exports	100	188	289	404	288
Available supplies for consumption	10,285	8,059	8,931	6,057	9,548

Germany therefore mines about three-fourths of her available supplies and has always been a dominant factor in the tungsten market of Europe. The imports were mostly of English and French origin, these countries contributing 54 to 60 per cent of the imports from 1909 to 1913. France took the bulk of the German exports.

PERSONAL

It is interesting to note that Charles M. Schwab celebrated the fifty-fourth anniversary of his birthday, Feb. 18, by concluding the negotiations for the purchase of the Pennsylvania Steel Company by the Bethlehem Steel Corporation.

Charles M. Smith, president Colonial Iron Company, New York, left Feb. 12 for a two weeks' sojourn at Miami, Fla.

F. H. Sparks, 331 West Main Street, Louisville, Ky., has been appointed local sales agent of the Knoxville Iron Company, succeeding W. P. Davis, who has been made general manager of the company.

At the annual meeting of the Philadelphia Traffic Club, Howard M. Newlin, traffic manager for the Pennsylvania Steel Company, was elected president.

Frederick A. Robinson, Jr., has resigned his position with the Pennsylvania Steel Company to become assistant manager of the Becker Milling Machine Company, Hyde Park, Mass.

Myles E. Ewing, for seven years sales manager of the Kirk-Latty Mfg. Company, Cleveland, has resigned from that company to become secretary and sales manager of the Falls Rivet Company, Kent, Ohio. Roy H. Smith is treasurer and general manager of the company.

W. A. Folger has been appointed manager of the Pacific Tool & Supply Company, San Francisco, Cal., succeeding Charles Stallman, deceased.

Homer A. Curtiss, recently president and treasurer of the Meriden Cutlery Company, has resigned as director of that company and accepted a managerial position with Landers, Frary & Clark, Inc., New Britain, Conn.

The connection of Thomas F. Du Puy with the Windsor Machine Company branch of the National-Acme Mfg. Company, Cleveland, Ohio, has been severed, following the latter's acquisition of the Windsor Company. Mr. Du Puy represented the Windsor Machine Company in the New York territory for several years.

R. G. Matthews, Allied Machinery Company of America, sailed for Bergen, Norway, Feb. 21. He will go thence to the company's office at Petrograd, Russia, to which he will be attached.

George F. McKay, who has been secretary and treasurer of the Otto Coking Company, 6 Church Street, New York, since its organization two years ago, has resigned, effective March 1.

John D. Hibbard, Chicago, commissioner of the National Metal Trades Association, is spending some weeks in Florida.

Joseph G. Butler, Jr., gave a dinner in honor of James A. Campbell, president Youngstown Sheet & Tube Company, at the Hotel Ohio, Youngstown, Thursday evening, Feb. 10. There were present, in addition to the host and Mr. Campbell, Samuel Mather, H. G. Dalton and Philip Wick of Cleveland, with E. L. Ford, H. H. Stambaugh, L. J. Campbell, John Stambaugh, W. E. Manning, Henry M. Garlick, C. S. Robinson, A. E. Adams, W. B. Hall, John Tod, George E. Day and M. E. Dennison of Youngstown. The responses to toasts were in general felicitation on the fact that Mr. Campbell is to remain in Youngstown in view of the abandonment of the project for the Youngstown-Cambria-Lackawanna merger. High tributes were paid to him for the way in which he had developed the Youngstown Sheet & Tube Company to its well recognized place of importance in the industry.

H. Coulby, president Pittsburgh Steamship Company, Cleveland, will be in California until the middle of March.

T. W. Robinson, first vice-president Illinois Steel Company, was one of the well-known residents of Chicago who was poisoned at the University Club dinner in that city which had prominence in the newspapers last week. Mr. Robinson has recuperated in part and will go to Florida for several weeks.

B. F. Bourne, president Bourne-Fuller Company, Cleveland, is in California.

Andrew Nicholas, formerly connected with the sales department of the Pittsburgh Crucible Steel Company, has resigned, and is now connected with Hickman, Williams & Co., Pennsylvania Building, Philadelphia.

L. H. Burnett, assistant to the president of the Carnegie Steel Company, Pittsburgh, and L. R. Palmer, of the department of labor and industry of Pennsylvania, talked about the new State workmen's compensation act and insurance requirements at the meeting of the Association of Iron and Steel Electrical Engineers, held in the Seventh Avenue Hotel, Pittsburgh, on Saturday evening, Feb. 19. W. O. Oschman, secretary, stated that the "Present State of Purchased Power in Relation to Steel Mill Work" will be discussed at the next meeting, to be held March 18.

Richard Cushman has resigned as treasurer of the Cushman Chuck Company, Hartford, Conn., to devote his time to other interests. He will retain his interest in the company. He is succeeded by E. L. Cushman, who will be president and treasurer. Charles G. H. Schomacher has been elected assistant treasurer.

W. J. Lavelle, New England Coal & Coke Company, Boston, Mass., has been elected secretary-treasurer of the By-Products Coke Producers of America, a new organization recently formed in Chicago.

At the annual meeting of the Fafnir Bearing Company, New Britain, Conn., held Feb. 15, A. G. Way was elected assistant treasurer and Maurice Stanley, secretary. Mr. Way has been purchasing agent for some time and Mr. Stanley was formerly in charge of the foreign department of the Russell & Erwin Company.

R. S. Coe has resigned as advertising manager of Landers, Frary & Clark, Inc., New Britain, Conn., to become assistant manager of the publicity department of the Norton Company, Worcester, Mass. He is succeeded by Louis Stephenson.

W. R. Kremer has been appointed general sales manager of the Vilter Mfg. Company, Milwaukee, Wis., succeeding Frederick Ulrich, deceased.

The Hilles & Jones Company, Wilmington, Del., announces the acquisition of Charles E. Thomas. For a few years past Mr. Thomas has lived in the far South, prior to which he will be remembered as the general manager and treasurer of the Cleveland Punch & Shear Works Company. He will take an active part in the sales department of the Hilles & Jones Company.

E. E. Forgeus has been appointed purchasing agent of the Eastern Car Company, Ltd., New Glasgow, Nova Scotia, effective Feb. 15.

M. E. Johnson, formerly one of the three managers of sales of the Pittsburgh Steel Company, with headquarters in the Frick Building, Pittsburgh, is now assistant general manager of sales, with headquarters in the Equitable Building, New York. E. Steytler is general manager of sales, with headquarters in the Frick Building, Pittsburgh.

The V & O Press Company, Glendale, Long Island, N. Y., manufacturer of sheet metal-working machinery, power presses and dies, recently added to its plant a one-story saw-tooth building of mill construction, thereby more than doubling the capacity. The increase in the demand for the company's standard product has taxed facilities for more than a year, and plans were made long ago for the equipment of this addition to the plant, and, it is expected, all will be installed and in full operation March 1.

The Lackawanna Steel Company, it is understood, will blow in one of its Colebrook blast furnaces at Lebanon, Pa., on ferromanganese on March 1, and put the North Cornwall furnace on pig iron.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, has opened a branch office in room 1503 Widener Building, Philadelphia, under the management of C. A. Anderson, Jr.

OBITUARY

PETER JAMES CUNNEEN, manager of the Lassig plant of the American Bridge Company, at Chicago, died Feb. 13, aged 57 years. He was born in Adrigoe, Ireland, entered the employ of the old American Bridge Company in 1878 and remained with that company and its various successors until the formation of the present American Bridge Company. He was secretary of the Chicago Forge & Bolt Company and later of the American Bridge Works. After the formation of the American Bridge Company he served as purchasing agent in charge of the Chicago district, and later was made manager of the Lassig plant, which position he held for about 15 years, up to the time of his death.

WILLIAM ALFRED PERRY, formerly a part owner of Henry R. Worthington, Inc., maker of steam pumps, died Feb. 16 at his home in New York City, aged 81 years. He was born in Brooklyn and was graduated from Columbia College in 1855, joining Henry R. Worthington a year later. He was a member of the Engineers' and University clubs, American Society of Mechanical Engineers, and various other societies.

JOHN W. HILL, local sales manager of the Bantam Anti-Friction Company, died suddenly at his home in Detroit, Mich., Feb. 12. Although he had been ill for several weeks his demise was unexpected. Mr. Hill ranged high as a tool designer. He was a member of the American Society of Mechanical Engineers and the Society of Automobile Engineers.

THOMAS L. KANE, Niles, Ohio, traffic manager for the Brier Hill Steel Company, Youngstown, Ohio, died suddenly Feb. 20, in the Waldorf-Astoria, New York City. He was in New York on business, and it had been his intention to go to Atlantic City for a few weeks for the benefit of his health.

VERTRUDE P. BUCK, president Shawmut Machinery Company, Boston, Mass., died suddenly at his desk, Feb. 15, from pneumonia. He was born in Virginia and had been associated with the company for 15 years, the last four as its president. He leaves his widow and four children.

H. MATHER BROOKS, local representative of the Jones & Laughlin Steel Company, died from heart disease, Feb. 14, at his home in New Haven, Conn., aged 42 years. He was born in Cheshire, Conn.

JACOB S. PEACOCK, president Carbon Steel Casting Company, Lancaster, Pa., died Feb. 15 from heart disease at Miami, Fla.

Call for Facts on Premium Wage Payments

The Efficiency Society, 52 Broadway, New York City, through W. Herman Greul, chairman of the board of trustees of the society, is asking for items of experience with regard to the effect of the introduction of time study or premium or bonus methods of wage payment upon the following points: happiness of the worker; health of the worker; accidents; wages; hours of labor; output; cost of product, and quality of product.

The object of the inquiry is to secure facts to present to legislators, either directly or through trade organizations, so that they may have a thorough understanding of the situation. Immediate attention is urged because of a bill presented to the House of Representatives by Congressman Tavenner of Illinois, designed to prevent the use of the stop-watch and the payment of premiums, etc.

The Avery Company, Peoria, Ill., whose rehabilitation from a financial condition which occasioned the placing of the company's affairs in the hands of a creditors' committee but a little more than two years ago, is a striking instance of the internal improvement of the business of agricultural implement manufacturers generally. It resumed the payment of dividends in January and in addition paid 7 per cent in arrears Feb. 1.

NEW ENGLAND LABOR TROUBLES

Organizing Campaigns of Machinists in 23 Cities —New Disturbances in Connecticut

The International Association of Machinists has opened a 10-week campaign to organize the machinists in 23 New England cities—Boston, Lawrence, Lowell, Fitchburg, Millers Falls, Holyoke, Springfield, Westfield, Taunton, New Bedford, Brockton, Quincy, Torrington, Waterbury, Ansonia, Bridgeport, New Haven, Meriden, New Britain, Hartford, New London, Derby and Pawtucket. Twenty officials and organizers have been detailed as speakers and the schedule has been so arranged that two speakers will attend each meeting and there will be 10 meetings in each city. The campaign started in Boston Feb. 15.

This movement is causing manufacturers in the affected localities some concern and in several cities the employers are quietly meeting and formulating plans for joint action if new demands or labor troubles develop. One of the elements which may affect the situation in some cities is the fact that there exists no uniformity in regard to working hours, rates of pay or methods of paying for overtime work among employers.

About 800 unskilled laborers in the American Brass Company's plants at Ansonia, Conn., walked out Feb. 16 without submitting demands. The next day, with their ranks recruited to thousands, they marched through the shops and swept every man out with them. It was simply a mob, determined that no one should work until they had secured an advance in pay. The strikers were composed of eight nationalities, speaking many dialects. A general committee, composed of three of each nationality, was formed at a meeting then held and demands were formulated, calling for a 55-hr. week with 60-hr. pay, five cents per hour increase in wages, time and a half for overtime and double time for Sundays and holidays. The American Brass Company rejected these demands but further conferences are planned. On Feb. 17 the company posted in all its factories in the Naugatuck Valley this notice: "Beginning Monday, Feb. 14, all employees working on an hourly rate or on piece work in this factory will receive a 10 per cent increase in wages, such increase in no case to be less than two and one-half cents per hour."

About 100 men are on strike at the plant of the Randolph-Clowes Company, Waterbury, Conn., for an increased wage and shorter working schedule.

Between 200 and 250 drop forgers, die sinkers and trimmers are on strike at the Remington Arms & Ammunition Company, Bridgeport, Conn. Many grievances are given by the strikers, but the principal trouble seems to be in regard to payment for spoiled work.

About 50 toolmakers, assemblers and polishers of the Bullock Mfg. Associates, Springfield, Mass., are on strike for the 8-hr. day. So far efforts to bring about a settlement have been futile but it is not believed that the trouble will be of long duration, as many of the strikers have been with the company for 30 years.

The Max Ams Company, Fairfield, Conn., has brought suit against George J. Bowen, business agent of Machinists' Union, No. 30, Bridgeport, asking a permanent injunction, a temporary injunction restraining picketing, and $5,000 damages. The case will be heard Feb. 23. Agent Bowen has announced that a general machinists' strike will be called affecting all the Bridgeport manufacturers if the injunction is granted.

Preparations have been made to take a strike vote of the local unions affiliated with the railroad department of the American Federation of Labor to enforce demands made upon the New York, New Haven & Hartford Railroad. These demands call for a flat increase of four cents an hour for machinists, blacksmiths, boilermakers, carmen, electricians and sheet-metal workers.

An article on tungsten mining in Colorado has been written for private distribution by Roy C. McKenna, president of the Vanadium-Alloys Steel Company, Pittsburgh. A copy of the article may be obtained on application to the company.

Pittsburgh and Nearby Districts

The Central Tube Company, First National Bank Building, Pittsburgh, works at Economy, Pa., has increased its capital from $655,000 to $665,000.

The Shenango Machine Company, Sharon, Pa., has increased its capital from $60,000 to $75,000.

Alex Laughlin & Co., First National Bank Building, Pittsburgh, have been appointed contracting engineers for the new open-hearth steel plant to be built by the Whitaker-Glessner Company, at Beech Bottom, near Wheeling, W. Va.

Appreciating the great benefits arising from attention to educational lines in connection with its numerous activities, the Westinghouse Electric & Mfg. Company, East Pittsburgh, has announced the formation of an educational department, with Channing R. Dooley as manager. Mr. Dooley has for some years been in charge of the company's educational activities and this appointment is an enlargement of the scope of the work and recognition of its importance.

Wheeling, W. Va., last week suffered the most serious natural gas shortage in its history. Nearly every manufacturing plant in the locality was forced to suspend operations for a few days. and more than 30,000 men were idle. The extreme cold caused much suffering.

Industrial plants in the Pittsburgh district are storing coal as fast as it can be obtained from the mines, in anticipation of a strike by the coal miners. The sessions of the conference committees and operators have thus far been without result.

The Pittsburgh-Des Moines Company, Pittsburgh, with a capital stock of $300,000, has been incorporated by E. W. Crellin and W. H. Jackson, Crafton, Pa., and George A. Smith, Des Moines, Iowa, to manufacture iron and steel, structural iron and steel work and construct bridges.

The National Concrete Sign Post Company, Oil City, Pa., with a capital stock of $30,000, has been incorporated by R. C. Beers and others to manufacture posts, pipe and similar reinforced concrete products.

The French Creek Foundry Company, Franklin, Pa., with a capital stock of $25,000, has been incorporated by Robert Ramsey, F. L. Liddle, Robert Carnick, Augustine S. Karns, Rollin R. Bleakly and Robert Ramsey, trustee, to manufacture metal castings.

C. F. Hamilton, Inc., Franklin, Pa., with a capital stock of $5,000, has been incorporated by C. F. Hamilton, Bess W. Hamilton and F. E. Crosby to engage in a general engineering and construction business.

The La Belle Iron Works, Steubenville, Ohio, has called for retirement on June 1, at 105, its $1,580,000 first mortgage 6 per cent bonds, due 1932. The sale recently of $3,500,000 first and refunding mortgage 5 per cent bonds provided for this maturity, and the new bonds after June 1 will be a first mortgage on substantially all the plants and properties of the company.

Reports that the National Tube Company, Pittsburgh, is installing eight open-hearth furnaces in its Lorain, Ohio, works are untrue, the number being four. A blooming mill is also being built. It has been decided by the company to install by-product coke ovens at Lorain, to supply its five blast furnaces there. About 225 ovens will be built, but the type has not yet been decided upon.

The Driggs-Seabury Ordnance Corporation, Sharon, Pa., has elected officers as follows: John Stevenson, Jr., chairman; A. E. Borie, president; W. L. Wright, vice-president; Nat Taylor, Jr., treasurer; H. H. Myers, assistant treasurer; S. B. Pratt, secretary. J. DePeyster Lynch has been elected a director in place of John Stevenson.

Upward of 300 Pittsburgh manufacturing firms, representing a score of industries, are said to have given tentative approval of the plan to secure representation in Paris through the French Society for Commercial Development, which was organized to supply France, Spain and Italy with American manufactures at the close of the war. Chairman J. Rogers Flannery, of the Pittsburgh Foreign Trade Commission, will sail for Paris soon to learn the exact scope of the French organization and the advantages to be gained by co-operating with it.

The Reznor Mfg. Company of Mercer, Pa., has received an order from England for 25,000 oil stoves.

The Carnegie Steel Company, Pittsburgh, has bought four large mill cranes for its Duquesne works, and expects to close soon for about 20 cranes for its new bar and shape mills at McDonald, near Youngstown, Ohio.

The Standard Mfg. Company, Kenova, W. Va., is in the market for wood-working machinery, hydraulic presses, dies, heavy-duty pumps, gas engines, an electric dynamo and other auxiliary equipment.

The two 90-ton open-hearth steel furnaces being erected by the Brier Hill Steel Company, Youngstown, Ohio, are expected to be completed early in April.

The Colonial Trust Company, Pittsburgh, has instituted foreclosure proceedings against the Isabella-Connellsville Coke Company, Uniontown, Pa. The Isabella properties, consisting of 45 tracts of coal land and surface in Luzerne Township, Fayette County, will be advertised for sheriff's sale, to be held March 6. The sale will be one of the largest of its kind ever held in the Connellsville region. The company is operating 260 ovens in the lower Connellsville district. The execution was issued on a judgment amounting to $7,043,796.

Locomotive Orders and Inquiries Large

Orders for nearly 160 locomotives and inquiries for over 300 have appeared in the last two weeks. The New York Central has ordered 95 locomotives from the Lima Locomotive Corporation, and is reported to contemplate buying many more. The Cuba Railroad will obtain 25 10-wheel locomotives and the Denver & Salt Lake 6 locomotives from the American Locomotive Company, while the Baldwin Locomotive Works is said to have taken an order for 20 from the British Government. The principal new inquiries embrace 90 locomotives from the Chicago & Northwestern, 50 from the New York, New Haven & Hartford, 30 from the Central of Brazil, 30 from the St. Louis & San Francisco and 12 from the Chicago, St. Paul & Omaha. Total inquiries now before the market are estimated at over 400 with considerable difficulty experienced in obtaining steel.

Pittsburgh Foundrymen's Association

The monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel, Monday evening, Feb. 21. The meeting was largely attended, nearly 150 being present, and was preceded by a dinner. A. O. Backert, secretary American Foundrymen's Association, presented a paper, illustrated by lantern slides, on the "History and Development of the Molding Machine." Four new members were elected, namely, M. R. McLean and J. R. Dunnsford, of the American Steel Foundries, Pittsburgh; Clark W. Hollister, Basic Mineral Company, Pittsburgh, and Frank Pottmeyer, Pittsburgh Iron & Steel Foundries Company, Midland, Pa.

The Industrial Commission of Ohio has had prepared by sub-committees safety and sanitary codes for iron and steel foundries and for steel plants of that State. These two codes have been approved by the general safety advisory committee of the commission and copies are being sent to owners of such plants to give them the opportunity of filing any criticisms they may make concerning the provisions embodied before they are formally adopted by the commission. The provisions of the foundry code are generally similar to those in the code recently adopted in Pennsylvania. Another code is being prepared for metal and wood-working shops.

Construction of the mill buildings for the new tin-plate works of the American Sheet & Tin Plate Company at Gary, Ind., is under way. The structures will have a ground area approximately 750 x 1700 ft., and are expected to be ready for operation by Sept. 1.

EXPORT VALUES IN 1915

Value of Iron and Steel Exports Far Above Previous Years—Huge Exports of War Material

WASHINGTON, D. C., Feb. 21, 1916.—Iron and steel products of all kinds were exported during the calendar year 1915 to the enormous value of $388,703,720, a total exceeding by nearly one-third the record of any previous year in the history of the country. Comparing these figures with the exports of tonnage commodities printed in THE IRON AGE last week, it appears that, while the shipments of articles reported by quantity gained only 19 per cent in 1915 as compared with the record total of 1912, the value of the entire class of iron and steel exports in 1915 exceeded the previously unbeaten total of 1913 by nearly 33 per cent.

The following table shows the total exports by values of iron and steel products for the decade 1906-1915:

Calendar Year	Value	Calendar Year	Value
1906	$172,555,588	1911	$249,656,411
1907	197,066,781	1912	289,128,420
1908	151,113,114	1913	293,934,160
1909	157,674,394	1914	199,861,684
1910	201,271,903	1915	388,703,720

For the period of the European war, beginning with August, 1914, and ending with the calendar year 1915, our exports of ammunition, explosives and firearms reached the huge total of $201,676,565. To this sum cartridges contributed $29,173,591, gunpowder $66,504,467, other explosives $90,443,012 and firearms $15,556,495. The development of this branch of our export trade incident to the war, which has risen from a total of $267,209 in August, 1914, to $46,782,276 in December, 1915, is shown in the following table, which presents the figures by months:

Exports of Ammunition, Explosives and Firearms

Months, 1914	Cartridges	Gunpowder	Other Explosives	Firearms
August	$154,080	$16,821	$26,336	$208,644
September	421,982	65,465	187,510	201,556
October	1,452,740	24,395	56,305	692,146
November	1,231,235	23,027	78,062	1,194,510
December	1,098,875	27,989	980,665	1,093,158
1915				
January	1,381,970	129,617	1,059,961	2,156,757
February	1,900,774	34,884	1,020,904	584,694
March	1,616,626	65,481	1,081,860	545,716
April	2,648,667	417,919	2,863,014	464,913
May	3,028,083	1,048,607	4,439,777	1,101,751
June	2,467,378	3,234,549	5,911,186	914,118
July	2,427,761	4,567,929	9,329,303	1,948,717
August	2,284,540	5,296,118	6,967,046	603,413
September	1,412,144	8,026,511	8,743,149	1,047,722
October	1,648,329	6,593,691	10,836,147	556,740
November	1,737,673	16,730,384	13,495,527	1,197,768
December	2,260,734	20,201,180	23,366,260	954,102
Total	$29,173,591	$66,504,467	$90,443,012	$15,556,495

The figures given in this table demonstrate that our shipments of these classes of war material have now reached a point where they constitute a surprisingly large percentage of our total exports. Had the rate of shipment reached in December, 1915, prevailed throughout the calendar year these goods would have constituted one-sixth of the total exports of all classes of merchandise. The figures also shed light on several interesting problems. There has been much speculation concerning the customs classification of enormous quantities of shrapnel and shells known to have been manufactured for export, but which have not appeared in the statistics and the trade has also found it impossible to trace large quantities of steel bars purchased for foreign account which have greatly exceeded the totals included in the current statistical bulletins showing exports of tonnage commodities.

It will be noted that the largest item in the above table is "other explosives," which, for the period of the war, aggregated $90,443,012, or nearly one-half the total of the classes covered by these figures. According to reports received from collectors of customs at the principal ports of exit, all loaded shrapnel and shells have been returned under the head of "other explosives," and it is understood that these items are chiefly responsible for the enormous increase in this category, the total of which has risen from a little over $1,000,000 in January, 1915, to $23,366,260 in December, 1915. It is understood that much less than half of the shrapnel and shells made in this country are exported in a loaded condition, the remainder being returned as "miscellaneous manufactures of iron and steel." It is interesting to note in this connection that the total exports of unenumerated iron and steel products for the calendar year 1915 approximated $65,000,000, as compared with a little more than $16,000,000 in 1914. With these figures in mind it is easy to see that, but for the manner of classifying shrapnel and shells which takes them out of the category of shipments reported by quantity, the exports of tonnage commodities, which apparently declined slightly in the last four months of 1915, would have continued their upward course and the record total of the year would have been even more stupendous.

W. L. C.

Baldwin Locomotive Works' Year

The income account of the Baldwin Locomotive Works for the year ended Dec. 31, 1915, compares as follows with the previous year:

	1915	1914
Gross sales	$22,083,011.06	$13,616,163.36
Cost	19,357,438.51	13,295,554.03
Manufacturing profit	2,725,572.55	320,609.33
Other income (including dividends of Standard Steel Works)	784,810.59	661,144.54
Total income	3,510,383.14	981,753.87
Deduct interest on bonds, deposit accounts, etc.	642,566.97	616,523.95
Profit	2,867,816.17	365,229.92
Less reserve	40,000.00	15,000.00
Net profit	2,827,816.17	350,229.92
Surplus brought forward	3,438,021.01	4,887,791.09
Total undivided profits	6,265,837.18	5,238,021.01
Dividend on preferred stock	1,400,000.00	1,400,000.00
Dividend on common stock	.....	400,000.00
Surplus	$4,865,837.18	$3,438,021.01

The consolidated balance sheet of the Baldwin Locomotive Works and Standard Steel Works Company, as of Dec. 31, 1915, is given below:

Assets

Real estate, machinery, tools, etc.		
Baldwin Locomotive Works		$37,295,863.30
Standard Steel Works Company		6,852,817.85
		$44,148,681.15
Other real estate		380,504.73
Inventories		10,003,721.01
Accounts receivable		7,568,372.52
Bills receivable		902,778.39
Marketable securities		1,951,215.15
Cash		1,330,704.14
Deferred charges		75,927.30
Sinking fund for Baldwin Locomotive Works, first mortgage bonds		200,000.00
Total		$66,561,904.39

Liabilities

Baldwin Locomotive Works:		
Preferred stock	$20,000,000.00	
Common stock	20,000,000.00	
		$40,000,000.00
Baldwin Locomotive Works bonds	10,000,000.00	
Standard Steel Works Co. bonds	3,400,000.00	
		13,400,000.00
Accounts payable		3,679,734.70
Payroll and salaries		175,729.50
Bills payable		1,750,000.00
Depositors' funds		1,002,150.17
Employees' benefit association		269,165.12
Accrued interest on bonds		83,334.00
Interest received in advance		30,831.94
Reserve for doubtful accounts		55,000.00
Surplus, Dec. 31, 1914	$4,139,947.84	
Net earnings, 1915	3,376,011.12	
Less dividend on prefererd stock	1,400,000.00	
		6,115,958.96
Total		$66,561,904.39

From the accompanying remarks of President Alba B. Johnson the following extracts are taken:

The depression of business affecting all the railroad-equipment industries continued throughout the first half of 1915, and it was not until August that domestic business began to show improvement. Fortunately, a contract was received in June for 250 large locomotives for the Russian Government. This contract was completed in September and October and proved to be the

forerunner of other important contracts. The production of the year amounted to $19,339,934.03 of locomotives and the other usual products of the works, and to $2,743,077.03 of other work resulting from the war, making a total production of every kind of $22,083,011.06.

The board of directors has considered it inadvisable to manufacture complete ammunition, but has authorized undertaking work to a considerable amount to be completed during 1916, subject to the provisions of the contracts as to cancellations. In connection with these orders, it was deemed advisable to take an interest of $1,000,000, par value in the recent Anglo-French loan.

In addition to the contracts taken directly as above stated, arrangements have been made for the erection of new shops on the company's property at Eddystone, Pa., suitable for eventual use for the construction of locomotives, but which are meanwhile to be occupied under lease as follows: By the Remington Arms Company of Delaware, for the manufacture of rifles. This plant occupies about 34.5 acres, on which buildings have been erected valued at $1,850,000. By the Eddystone Ammunition Corporation of New York, for the manufacture of shells. This plant occupies about 65 acres, on which buildings have been erected valued at $1,600,000.

Upon these contracts of lease to the two companies mentioned the Works will derive as a profit the return of the buildings leased, together with a further rental payment upon each rifle or shell manufactured, if these contracts are satisfactorily completed.

As an essential part of the improvement of the Eddystone property, a pier is being built in the Delaware River, which will permit of loading locomotives and other merchandise on sea-going vessels directly from our own property.

The total sales of the Standard Steel Works Company for the year 1915 were $5,720,248.70, and the net profits $844,097.06. After providing for interest and sinking fund payments of $200,000 and dividends of $300,000, the balance remaining for surplus account is $344,097.06. Of the $5,000,000 Standard Steel Works Company bonds originally issued, $1,600,000 has been canceled by the provisions of the sinking fund, leaving the amount outstanding $3,400,000.

A Large Magnesite Deposit

A deposit of magnesite of unusual character has been brought recently to the attention of the United States Geological Survey and promises to yield a large and easily-won supply. It lies in Clark County, Nev., in the valley of Muddy River, a few miles above St. Thomas, Nev. The purer part of the deposit consists of beds aggregating at least 200 ft. in thickness. Unlike most other deposits in California and elsewhere in this country this is not a vein deposit, such as occurs with serpentine, but resembles closely those discovered in 1911 at Bissell siding near Mohave, Cal., which are not so large or regular as the deposit at Muddy River. Analyses show silica, 11 to 12 per cent; alumina and ferric oxide, about 1 per cent; lime, 5 to 6 per cent; carbon dioxide, 43 to 44 per cent, and magnesia, 36.50 to 36.75 per cent.

Manganese Ore from Virginia

The Crimora Manganese Corporation, 15 Broad Street, New York, expects to have its new washing and crushing mill at its mines at Crimora, Va., operating by March 15 and turning out 100 tons of high grade manganese ore per day. The deposits were described in THE IRON AGE of April 8, 1915.

At the annual meeting of the Cluley Multiplier Company, now of Green Bay, Wis., where a factory for the production of counting machines has recently been established, officers were re-elected, as follows: President, John P. Cluley; vice-president, A. L. Gebhardt, Milwaukee; secretary and treasurer, Iver Terp, Green Bay. Active production will be undertaken at once, the preliminary work having been completed. Mr. Cluley is in active charge.

Auto Trucks Compared with Horses

The Kissel Motor Car Company, Hartford, Wis., has received a report from a firm using a fleet of KisselKar trucks, which says:

"Last year we kept an account of each of the trucks we own. We found that in the case of the 4-ton truck it cost us for gasoline, oil, tires and repairs, including all new parts used, $2.68 per day, for 300 working days. We consider it advantageous to use a driver and helper in the operation of our trucks, which is an additional expense of about $5 per day. We have also estimated as depreciation 15 per cent on our present inventory valuation, which amounts to about $1 per day. Adding the items together, we have:

Gasoline, oil, tires and repairs	$2.68
Driver and helper	5.00
Depreciation	1.00
Total for one day	$8.68

"We have no trouble delivering each day four loads of 4 tons each within a radius of 5 miles, which you can see gives us a delivery charge of 55c per ton. As we decrease the distance we can increase the number of trips.

"When we first thought of using trucks for this delivery, we asked ourselves this question: 'Can we deliver as quickly and as positively with automobile trucks as we can with horses?' Our answer is: Five years ago we were using 25 horses and this one 4-ton KisselKar truck. To-day we are using a 5-ton, a 2½-ton, a 2-ton and a 1-ton KisselKar truck and four horses. Eighty per cent of the orders that come in over the telephone are accompanied with the request: 'Send it in one of those KisselKar trucks.'

"A horse-drawn vehicle with two good horses, drawing at the most three tons, would not make more than two trips each day within a five-mile radius. Such a team will cost to operate at least $5 per day, so it is quite easy to figure which would be the cheaper, forgetting the convenience, rapidity, etc., of the truck over the horse. Again, barring serious trouble, when the truck comes in at night, it can, if necessity calls, again go on another long journey after a good drink of gasoline, while the horse must be put in the barn for many hours' rest before we can safely use him.

"With horses our deliveries were confined to a comparatively small circle; now we think nothing of going 10, 15 or even more miles and compete with railroad rates, taking into consideration that we deliver direct from the storehouse to the spot where the product is to be used. For this reason the auto-truck user will get the preference often at a better price."

Sulphuric Acid Exports and Prices Soar

Exports of sulphuric acid in October, 1915, the latest published data, were 8,561,147 lb., making the total 71,997,192 lb. to Nov. 1, 1915, the largest on record both for a month and for ten months. The total to Nov. 1, 1914, and 1913, was 8,068,743 lb. and 7,202,110 lb. respectively. For the fiscal year of 1910 the total exports were only 5,081,038 lb. and in that of 1914 they were 12,131,750 lb.

Before the war 60 deg. sulphuric acid sold at about $10.50 to $11 per ton in tank car lots with $12 to $13 obtained for 66 deg. acid. While as high as $110 is said to have been received for tank car lots, some makers are now selling regularly at $40 to $45 for 60 deg. acid in tank car lots. Another producer is understood to be obtaining $75 per ton in tank car lots and $80 per ton for acid in carboys for 66 deg. acid. Commercial acid obtained as a by-product in zinc smelting is reported to be sold at $24 to $30 per ton.

In connection with the consolidation of the Louisville Board of Trade and the Louisville Commercial Club, under the name and charter of the former, a plan has been broached to establish a fund of $1,000,000 with which to assist in financing new manufacturing enterprises brought to the city. Thomas Floyd Smith is president and W. E. Morrow, secretary.

The J. G. Brill Company's Report

The annual report of The J. G. Brill Company, Philadelphia, for the year ended Dec. 31, 1915, presents the following income account, which includes operations of subsidiary companies:

Total sales and other income	$4,403,116.72
Less material used and operating and general and administration expenses for the year	4,122,817.32
Profit for the year	$280,299.40
Less amount set aside and added to reserves for depreciation	163,973.10
Net profit, undistributed, added to surplus	$116,326.30
Surplus account, previous year	$1,368,370.46
Less adjustments	53,514.78
	$1,314,855.68
Profit as above	116,326.30
	$1,431,181.98
Less dividends paid during year	183,200.00
Net surplus	$1,247,981.98

The combined balance sheet, as of Dec. 31, 1915, is as follows:

Assets	
Value of properties (less reserves)	$8,107,826.45
Materials, raw and in process	1,739,319.16
Bills and accounts receivable	1,216,392.12
Investments	328,206.27
Cash	425,468.95
Total	$11,817,212.95
Liabilities	
Preferred stock	$4,580,000.00
Common stock	5,000,000.00
Bonds (John Stephenson Company)	400,000.00
Bills and accounts payable	589,230.97
Surplus	1,247,981.98
Total	$11,817,212.95

From accompanying remarks of President Samuel M. Curwen the following extracts are taken:

The total combined output of the company's plants in sales value for each of the past nine years is as follows:

1907	$9,211,825.72	1912	$7,842,090.68
1908	3,845,173.91	1913	9,154,433.79
1909	4,261,204.90	1914	4,903,510.70
1910	5,960,778.61	1915	4,403,116.72
1911	5,870,907.47		

The operations of the plants of the company for the year 1915 resulted in a combined profit of $280,299.40, after charging against the earnings of the year $174,897.31, expended for maintenance and repairs necessary to keep the properties in good and efficient physical condition. From this amount of profit there has been set aside into the reserves for depreciation $163,973.10. The net profit after this deduction amounts to $116,326.30. The reserves for depreciation now aggregate $1,738,816.50.

The general business of electric car and truck manufacturing reached a condition of depression during 1915 without parallel in the history of the industry. This company obtained at least its full share of all the orders placed during the year, but the prices resulting from the competition brought about by such conditions were, of necessity, extremely low. The management was able during the year to obtain orders for the manufacture of material for export as the result of existing conditions in Europe, including principally motor transport bodies and shell forgings. Many delays, unavoidable so far as the management was concerned, prevented the completion of a large measure of these shell orders, with the result that much of the profit which it was hoped would be realized thereon in 1915 was not earned in that year. An extension of the time of delivery under these contracts has been granted by the purchasers.

The board of directors deemed it inadvisable during the year to increase the preferred stock dividend to the regular annual rate of 7 per cent.

The general conditions governing the particular industry of the company began to improve in the latter part of 1915, and the improvement is continuing and increasing; the general revival of business seems to have reached this company's industry. This present year, therefore, is begun under much more hopeful conditions than existed at the beginning of 1915. On Feb. 5, 1916, the combined orders of the company and its subsidiaries amounted to $4,765,985, compared with $1,147,100 on hand Feb. 6, 1915.

Good Showing for Slag Concrete

Concrete made from blast furnace slag showed over 18 per cent greater resistance to compression than concrete made of trap rock from the Palisades, according to an extended series of experiments made at Columbia University, New York. The slag used was that recovered from the large slag dumps of the Bethlehem Steel Company at South Bethlehem, Pa., and marketed by the National Slag Company, Newark, N. J., which has a reclaiming and crushing plant at South Bethlehem. The tests were conducted for the building departments of New York and Newark, the Public Service Commission of the First District of New York, the Public Utility Commission of New Jersey and the Erie Railroad.

Four tests were made in each case of 8 x 16-in. cylinders of concrete of 28 days, 3 months, 6 months and 12 months age, the concrete made of sand from the same source and in the same way. A 1:2:4 mixture was used. The National slag concrete of the 28-day period averaged 2465 lb. per square inch compressive strength, which was 24.8 per cent higher than the trap-rock concrete. The slag concrete of 3 months showed 3496 lb. compressive strength, or 18 per cent better than the rock concrete; for 6 months the strength was 3567 lb., and 16.9 per cent better than the rock concrete, and for 12 months, the strength was 4187 lb., against 3537 lb. for the rock concrete, or 18.4 per cent better. National slag weighs 80 lb. per cubic foot and Palisade trap rock 100 lb.; the concrete with the slag weighs 140 lb. per cubic foot, and that with the rock weighs 151 lb. per cu. ft.

American Coal Products Company Now the Barrett Company

It is announced that the American Coal Products Company and the Barrett Mfg. Company have decided to unite the two concerns under the name of the Barrett Company. The American Coal Products Company is known in connection with the sale of sulphate of ammonia, and heretofore owned the stock of the Barrett Mfg. Company.

The fact that coal tar chemicals, disinfectants, roofing, waterproofing, road-making and wood preserving materials have been made and widely advertised in the name of the Barrett Mfg. Company has added immensely to the good-will attached to the Barrett name. This increase, however, has not been connected in the minds of the general public with the securities of the American Coal Products Company.

The new company will have the same amount of stock as the American Coal Products Company and the change in name will be accomplished by exchanging the outstanding certificates share for share.

American Specifications in Foreign Languages

The executive committee of the American Society for Testing Materials announces that an arrangement has been made with the Department of Commerce by which standard specifications of the society having an important bearing on the requirements of export trade will be translated into foreign languages by the department. They are to be distributed among the United States consular offices and they may be obtained at moderate prices by American manufacturers and others interested in foreign trade. It is the plan that each specification in a foreign language will be accompanied by the original English version and all numeric quantities will be given in both the British and the metric systems.

James Whalen, president of Western Drydock & Shipbuilding Company, Port Arthur, Ont., Canada, announces that his company has received a contract for the construction of two ocean-going freight steamers to be built at once.

Machinery Markets and News of the Works

DEMAND HOLDS STRONG

Plants Everywhere Are Being Enlarged

Deliveries of Machine Tools Somewhat Improved —Second-Hand Market Is Very Active— Railroad Requirements Still Small

Machine tool demand shows increasing strength everywhere, although some markets are quieter than others. Delivery on some turret lathes, engine lathes and boring mills is a little easier; but delayed shipment of equipment is still the great retarding influence to increased business. The never-ending succession of plant additions made necessary by the strengthening of domestic markets is probably the chief factor in new business. Tool users are constantly increasing their demand throughout the Milwaukee territory; and Cleveland, which has been quiet for the past few weeks, again reports active buying. Chicago finds equipment needs increasingly attractive and the minor machine-tool centers throughout the South and West report strong and healthy conditions.

The railroads are doing some buying. The unusual circumstance of a railroad purchasing second-hand equipment was instanced in a recent purchase of a few machines by the Rock Island. The Seaboard Air Line is in the market for punches, shears, steam hammers, flanging machines and other heavy tools for its shop at Portsmouth, Va. The Baltimore & Ohio is inquiring for turret lathes, spot welding machines and special railroad shop tools. The New York Central is in the market for a heavy plate shear and a double end punch.

Second-hand machinery is exceedingly active. The Cambria Steel Company recently bought a second-hand steam hammer, which indicates the call for machinery of this kind.

The Reddig Steel Valve Company, Cleveland, has purchased the plant of the Seneca Chain Company, Kent Ohio, and is seeking new or second-hand turret lathes, engine lathes, hand screw machines, vertical milling machines, shaping machines, plate shears, straightening machines and miscellaneous equipment. The Enterprise Mfg. Company, Frederick, Md., is inquiring for equipment for the manufacture of metal spigots. J. K. Stewart, New York, is equipping an automobile parts factory in Long Island City, as is also the Pouvailsmith Corporation, Poughkeepsie, N. Y.

The plant of the Farist Steel Company, Bridgeport, Conn., was destroyed by fire Feb. 16, with a loss of $100,000, in spite of considerable salvage of machinery. V. F. and H. V. Prentice, formerly of Prentice Brothers Company, Worcester, Mass., have again started the manufacture of machine tools in Worcester. The Burgess Company & Curtiss, Marblehead, Mass., has been sold to the Curtiss Aeroplane & Motor Company, Buffalo, N. Y.

B. W. Harris, agent for Harris Brothers, machine tool dealers, Chicago, has announced that a factory for the manufacture of gasoline engines, trucks, jacks, patterns, dies and jigs will be erected at Minneapolis at a cost of $350,000. The Bettendorf Trailer Company, Bettendorf, Iowa, newly incorporated, will erect a shop 300 ft. square. The Maryland Metal Cross Tie Company, Baltimore, Md., will build a plant with an annual capacity of 500,000 ties. The Baltimore Dry Dock & Shipbuilding Company has applied for permission to extend its plant at a cost of $500,000. The John E. Smith Son's Company, Buffalo, N. Y., manufacturer of butchers' and packers' machinery, is erecting a two-story building, 55 x 146 ft. Kraeuter & Co., Inc., tool maker, Newark, N. J., is building an addition to its plant.

Some of the munition manufacturers are now employing help to operate their plants on the war contracts which have been so much before the public. About 1000 girls and women are now being added to the payroll of the Eddystone Munitions Company, Eddystone, Pa., to pierce shells, and later on for loading operations. The Jeanesville Iron Works, Hazleton, Pa., of the International Steam Pump Company, have put on a night shift and will have a force of 1200 workmen by April.

New York

NEW YORK, Feb. 23, 1916.

There is continued evidence that the demand from the domestic industrial field is quieter, although much more could be done with some types of tools, notably milling and grinding machines, were it possible to get better deliveries. Deliveries on some sizes of turret lathes, engine-lathes, boring mills, etc., are a little easier to obtain than they were a few weeks ago. At the same time there is a good volume of inquiry, and a few of the railroads are showing some life.

The Seaboard Air Line is in the market for a number of punches, shears, steam hammers, flanging machines and other heavy tools for railroad shop use, delivery to be at Portsmouth, Va. The Pennsylvania Railroad has made a few inquiries. The Baltimore & Ohio is inquiring for a good-sized list of tools, including turret lathes, electric spot welders and special railroad shop tools.

The Enterprise Hardware Mfg. Company, Frederick, Md., is inquiring for machinery for the manufacture of metal spigots.

J. K. Stewart is equipping a plant in Long Island City for the manufacture of automobile parts. A part of the needed equipment already has been purchased.

Ballinger & Perrot, Seventeenth and Arch streets, Philadelphia, Pa., and Marbridge Building, New York, are preparing plans for a 6-story factory at Jackson Avenue and Paynter Street, Long Island City, for Philip H. Lindgren, care of Stewart Speedometer Company, Chicago, Ill.

The Pouvailsmith Corporation, Poughkeepsie, N. Y., is equipping a plant for the manufacture of automobile steering wheels, radiator caps and other automobile specialties.

Kellogg & Co. have established an office at 120 Broadway, New York, to carry on an export business in machinery and supplies. The company is a branch of a Toronto concern and it will export chiefly to Canada. It is now mostly interested in fuse equipment, indicating that Canadians are turning their attention to fuse work. Most of the fuse contracts have been distributed in the United States. Another phase of the export situation is that many machines which have been purchased by Japanese have been for shipment to Russia by way of Japan.

A business which has made great strides in recent months is the making of gages and special tools for shell and ordnance work. Black & Decker, Baltimore, Md., are employing 125 men in a newly equipped shop in the manufacture of these small tools.

Makers of forging machinery are extremely busy and are finding it difficult to make the deliveries requested.

Second-hand machinery is exceedingly active.

The Machinists Supply Company, Pittsburgh, Pa., is in the market for 61,000 taper pins, as follows: 20,000 6-in., No. 7, 10,000 6-in. No. 8, 1,000 6-in. No. 9, and 30,000 7-in. No. 6. They are to have ¼-in. taper per ft.

The Turner Construction Company, 11 Broadway, New York, has been awarded general contract by the John E. Smith's Sons Company, Buffalo, N. Y., manufacturer of butchers' and packers' machinery, for the construction of a reinforced concrete building, 55 x 146 ft., two stories and basement, with provision for two additional floors, and also for two one-story buildings. The estimated cost of the buildings is $35,000.

The Driver-Harris Wire Company, Harrison, N. J., has purchased property adjoining its plant for future development, but does not contemplate any additional buildings at this time.

The Southern Zinc & Mining Company, 115 Broadway, New York, has announced details for the development of a large tract of zinc ore land in Sullivan County, Tenn., and Scott County, Va., with operating headquarters at Bristol, Tenn. The ore will be mined and a concentrating plant equipped. Machinery will include air compressor, drills, pumps, wet concentrating equipment, etc. J. H. Banks, mining engineer, 61 Broadway, New York, is handling the details of the proposition.

Kraeuter & Co., Inc., manufacturer of tools, 571 Eighteenth Avenue, Newark, N. J., is having a one-story addition, 37 x 100 ft., constructed for use in connection with its heat-treating department.

The Fairmount Machine Mfg. Corporation, Jamestown, N. Y., capitalized at $50,000, has been organized to manufacture engines, boilers, machinery, etc. O. A. Lenna, E. C. Fliege, Jamestown, and L. Lakin, Jr., Mayville, N. Y., are the incorporators.

H. C. Kittredge, German Insurance Building, Rochester, is preparing plans for a municipal waterworks system for Red Creek, N. Y.

The board of contract and supply, Rochester, F. X. Pifer, secretary, is taking bids for two electric pumps and one water tower.

The Buffalo Pressed Steel Company, Inc., Buffalo, has been organized with a capital stock of $30,000 to manufacture iron, steel, aluminum, copper and brass products. D. H. Stoll and R. J. MacKenzie of the D. H. Stoll Company, Inc., manufacturers of presses and sheet metal working machinery, and K. B. MacDonald of the Curtiss Aeroplane Company, are the incorporators.

The Wickwire Steel Company, Buffalo, has let contract to the Alliance Machine Company, Alliance, Ohio, for a 150-ton ladle crane, a 50-ton traveling crane and four smaller traveling cranes for its new steel mills adjoining its blast furnace plant on Niagara River.

Application has been made to the Public Service Commission by the Seneca Power Corporation, Seneca Falls, N. Y., for permission to increase its capital stock from $5,000 to $1,600,000 and to issue $450,000 in bonds to build a hydro-electric power plant at Seneca Falls.

Philadelphia

PHILADELPHIA, PA., Feb. 21, 1916.

The continued spur to business activity is emphasized by developments such as at Pottstown, Pa., where the puddle mill of the George B. Lessig Company and the nearby plate mill leased by the Nagle Steel Company at Glasgow are preparing for operation. The McClintic-Marshall Construction Company, which recently finished two buildings for the Remington Arms Company at Eddystone, has received contract for a new building to be erected by the Baldwin Corporation at Chester.

The Pottstown Machine Company, Pottstown, Pa., is reported to be working on an order for several hundred lathes for the Remington Arms Company. Fifty 12-in. lathes have been finished; fifty more are to be 10-in. and another fifty 17-in.

The North American Motor Company, Pottstown, Pa., has made an initial shipment of its motor trucks to Manchester, England. This company has been recently established.

It is currently reported that the DuPont de Nemours Powder Company, Wilmington, Del., will establish a chemical plant adjoining the Philadelphia & Reading pier at Wilmington. At New Castle the Bethlehem Steel Company has started negotiations for about 47 acres of land adjoining its projectile loading plant. The General Electric Company is preparing to put its neighboring loading plant into operation.

It is stated that a strike called by twenty stokers at the plant of the John A. Roebling's Sons Company, Trenton, N. J., necessitated closing about one-third of the plant for the second time within a few weeks.

The Berks Foundry & Mfg. Company has recently purchased the former A. & H. Foundry Company plant at West Hamburg, Pa. The new company contemplates a number of changes, chiefly improvements to the main factory. It is installing a large sand blast outfit, a two-ton tram rail, etc. W. T. Adams of the Adams Mfg. Company, Reading, Pa., is the president; G. Frank Rickert of the Keystone Badge Company, Reading, is secretary and treasurer, and Emery Dunlap of Pottsville is manager. W. T. Adams, G. F. Rickert, Emery Dunlap, C. H. Derr, an attorney of Reading, Pa., and Alexander L. Luria, scrap iron dealer of Reading, are the directors.

About 1000 girls and women will be added to the payroll of the Eddystone Munitions Company, Eddystone, Pa., to be employed chiefly in piercing fuses for shells. The operators will manipulate a machine resembling a sewing machine for this kind of work. It is said they may be later employed in the loading operations.

The Jeanesville Iron Works, Hazleton, Pa., which is manufacturing munitions, has put on a night shift, and it is expected to have a force of 1200 hands employed by April.

Wilmot & Lloyd, now operating the Franklin Iron Works plant at Port Carbon, near Pottsville, Pa., have recently doubled their working force, and are said to have orders to keep the plant running for two years. The output is an automatic grate.

The plant of the International Motor Company at Allentown, Pa., has recently received orders for about 94 trucks, all for domestic use. It has also received a large order for trucks to be shipped to Sweden.

Charles J. Webb & Co., wool merchants, Delaware & Walnut streets, Philadelphia, have awarded contract for the construction of a ten-story warehouse, 150 x 200 ft., to cost about $500,000.

The Air Reduction Company, 50 Broad Street Building, New York City, is erecting a plant at Germantown and Sedgley avenues, Philadelphia, which it is said will be the largest plant for the production of oxygen and nitrogen ever built in this country. It plans to locate additional plants within the next year in all important industrial centers in his country. The Philadelphia plant will be 70 x 100 ft., one story. The William Steele & Sons Company, 1600 Arch Street, Philadelphia, is the contractor.

The Traymore Company, operator of the Hotel Traymore, Atlantic City, N. J., has plans prepared by Price & McLanahan, Philadelphia, for a garage, 75 x 150 ft., to be erected near by.

E. F. Stichter, Macungie, Pa., has been given a site by the Macungie Improvement Association and will erect a shop, 40 x 65 ft., for general machine shop work.

The Pennsylvania Equipment Company, Coleman Building, Philadelphia, is in the market for two second-hand Whirlies.

The Biehl Iron Works, Inc., Reading, Pa., has been incorporated with a capital stock of $25,000 by Lambert A. Kehr, and Thomas I. Snyder of Reading, and William Knopp, 117 North Eighth Street, Lansdale, Pa., to manufacture machinery, tools and appliances.

The Reliance Dental Laboratories, Philadelphia, Pa., has been incorporated with a capital stock of $10,000 by Morris Finkleman, 917 South Fifty-eighth Street, Philadelphia, and others, to manufacture dental supplies and appliances.

The F. J. Stokes Machine Company, Philadelphia, has been incorporated with a capital stock of $5,000, by Francis J. Stokes, and Leslie W. Stokes, 724 Locust Avenue, Germantown, and Francis Stokes, to manufacture and assemble machinery.

Plans have been approved for a new machine shop at South Bethlehem for the Bethlehem Foundry and Machine Works. The Westinghouse-Church-Kerr Company has the contract.

The Mammoth Garage Company, Reading, Pa., has been incorporated with a capital stock of $25,000 by E. S. Wertz, Wyomissing, Pa.; J. Ganter, G. F. Althous, S. H. Hoverter and M. S. Hoverter, Reading, Pa., to operate a garage and repair plant.

The Ideal Changer Company, Harrisburg, Pa., has been incorporated with a capital stock of $10,000 by Edward G. Kostner, 261 Herr Street. Russell H. George, 1830 Fulton Street, and John W. Shatto, 1720 North Third Street, all of Harrisburg, Pa., to manufacture a patented metal money changer, novelties, etc.

Welsh & Davis, Inc., Philadelphia, Pa., has been incorporated with a capital stock of $15,000, by Frank H. Casey, 2452 South Lambert Street, Philadelphia; Amanda M. Casey

and Helen Casey, 2452 South Lambert Street, Philadelphia, to manufacture opticians' appliances and supplies.

The Strasburg Tag & Novelty Company, Strasburg, Pa., has been incorporated with a capital stock of $10,000, by William G. Fritz, Elias Groff, Jr., Martin M. Keener, L. J. Bair and B. N. Trout, to manufacture novelties and machinery.

Baltimore

BALTIMORE, MD., Feb. 21, 1916.

The Baltimore Drydock & Shipbuilding Company, Baltimore, has applied for permission to extend its plant at a cost of between $350,000 and $500,000. The application is meeting with some opposition. The company desires to extend the present ship railway over 100 ft. and widen it 40 ft. It is said the plans also include the construction of a structural steel workshop. Recently it was compelled to decline considerable work because of the lack of facilities.

Chief Engineer Calvin W. Hendrick, Baltimore, has submitted plans and specifications to Mayor Preston for a contemplated hydroelectric plant in Jones Falls Valley, near Baltimore. Definite action by the city officials is expected this week.

The Mutual Chemical Company, 1348 Block Street, Baltimore, will build a two-story addition to its plant, to cost about $6,000.

Oliver B. Wight, architect, Munsey Building, Baltimore, is preparing plans for a four-story concrete garage, 60 x 130 ft., to be erected on Cathedral Street, near Mount Royal Avenue. It will be used by the Autocar Sales Company.

The Southern Brass Works, Portsmouth, Va., has been incorporated with $50,000 capital stock. F. R. Handley, Norfolk, Va., is secretary.

The Maryland Metal Cross Tie Company, 627 Munsey Building, Baltimore, Md., incorporated last December with a capital stock of $3,000,000, will build a steel foundry with electric motive power, to have an annual capacity of about 500,000 ties. Plans include one building, 200 x 400 ft., and several smaller ones. A. Freeborn Brown, Havre de Grace, Md., is president; Stevenson A. Williams, Belair, Md., vice-president; Clarence C. Foreman, Govans, Md., is secretary and William J. S. Millar, Baltimore, treasurer.

Chicago

CHICAGO, ILL., Feb. 21, 1916.

Except for the increasing attractiveness of the business of normal character which is appearing more freely, the machinery trade offers few new features. The railroads are still out of the market, though some of the roads are known to be proceeding with shop construction and extension work that will later require equipment. The unusual circumstances of a railroad buying second hand tools is noted in connection with a recent purchase of a few machines by the Rock Island Railroad. Sales of miscellaneous power equipment run into considerable volume but the proportion of this business going to the railroads is much below normal. An interesting evidence of distorted conditions is noted in a recent purchase at Chicago of a large second hand steam hammer for shipment to the Cambria Steel Company at Johnstown, Pa.

The Metal Specialties Mfg. Company, Chicago, has increased its capital stock from $60,000 to $100,000.

Reuter Brothers, iron workers, 5935 South Ashland Avenue, Chicago, will build a one-story brick shop, 65 x 124 ft., at 5814 South Wood Street.

The Kiserman Shade Roller Factory, Kankakee, Ill., has been purchased by Ross Parker, R. L. and O. L. Chiniquy, who will organize a company to manufacture automobiles and will remodel and extend the factory to meet the needs of that work.

The Rockford Milling Machine Company, Rockford, Ill., has increased its capital stock from $50,000 to $200,000.

The Kankakee Tile & Brick Company, Kankakee, Ill., will erect a new plant to cost approximately $85,000.

The Mineral Point Zinc Company, Depue, Ill., has begun the construction of a new oxide plant of modern steel and concrete construction, located west of its present smelter department. The equipment will consist of furnaces, ore handling plant, fans, flues and mechanical bag houses.

The Recip-Roto Engine Company, Owensboro, Ky., has been organized with a capital of $400,000 to manufacture a rotary steam engine. G. F. Moors is the president and general manager.

The R. T. Hugo Mfg. Company, Duluth, Minn., maker of light metal goods, will erect a $30,000 plant, to be completed by June 1.

B. W. Harris, Minneapolis, has announced that a factory building to cost $350,000 would be erected in the Midway district to manufacture gasoline engines, also jacks, trucks, patterns, jigs and dies. Mr. Harris is the agent of Harris Brothers, Chicago.

The Carterville Sheet Metal Company, Carterville, Mo., has been incorporated with a capital of $12,000 by F. C. Wallover, L. R. Reynolds and John Boyd. It will manufacture sheet metal and mining machinery.

The Bettendorf Trailer Company, Bettendorf, Iowa, has been incorporated with a capital of $100,000. The company has been manufacturing automobile trailers at Bettendorf for several months and in the spring will erect a shop building, 300 x 300 ft. J. W. Bettendorf is president.

The Louden Machinery Company, Fairfield, Iowa, will build a two-story factory.

The Fitzsimmons Steel Products Company, Milwaukee, Wis., has taken out a permit for a one-story factory building, to cost $24,000.

The Michigan Drop Forge Company, Pontiac, Mich., has been incorporated with a capital of $150,000, to manufacture iron and steel products.

The Clipper Belt Lacer Company, Grand Rapids, Mich., has increased its capital stock from $100,000 to $200,000 to provide for the extension of its plant which has been under way. The new portions of the works with equipment installed are expected to be ready by midsummer.

The Anderson Foundry & Machine Works, Anderson, Ind., is making preparations to enlarge its molder's room.

The International Iron Works, Evansville, Ind., will erect a planing mill, 30 x 160 ft., to cost about $8,000. The most modern machinery will be installed.

The Western Iron & Foundry Company, Wichita, Kan., will erect a one-story reinforced concrete plant, to cost $4,000.

The A. H. Nilson Machine Company, Bridgeport, Conn., has taken out a permit to add another story to its factory on Bostwick Avenue.

The C. G. Garrigus Machine Company, Bristol, Conn., is asking bids on the erection of an addition, 80 x 96 ft., two stories.

The Dean Wire Goods Company, Worcester, Mass., wire specialties, has been sold to Harry S. Tripp, Spencer, Mass., who will continue the business which was established 80 years ago. It is reported that the retiring owners, Phillips Vialle, Loren T. Baker and Harry Whittaker, will engage in the wire goods business in Worcester and may secure the factory of the National Mfg. Company, now in bankruptcy.

The Waterbury Press, Metal & Tool Company, Waterbury, Conn., has been incorporated with capital stock of $20,000 by Alfred L. Schwartz, August G. Jordan and Ernest S. Austin.

G. Haarman & Co., Holyoke, Mass., are to build an addition, 48 x 72 ft., one story.

New England

BOSTON, MASS., Feb. 21, 1916.

The Bridgeport Forge & Projectile Company, Bridgeport, Conn., has filed a notice of an increase in capital stock from $2,000 to $7,000,000. Of the common stock, $5,000,000, George W. Hoadley, New York, holds 499,900 shares; Carl Foster, Bridgeport, 80 shares; E. J. Taylor and Frederick E. Morgan, Bridgeport, 10 shares each. The preferred stock, $2,000,000, is divided in the same proportion.

The Bridgeport Electric Mfg. Company, Bridgeport, Conn., has been incorporated with capital stock of $5,000. The officers are: President, P. Berggren; vice-president, John Weckman; treasurer, Alexander Hedin; secretary, Charles S. Ferrett.

The Eastern Brass & Ingot Company has purchased a site in Waterbury, Conn., and has awarded a contract for a factory to the Samuel Austin & Son Company, Bridgeport, Conn.

The Standard Engineering Company, Waterbury, Conn., is to erect a two-story factory on Burrall Court.

A project to consolidate the Claremont Power, the Contoocook Light and the Bradford Light & Power companies is under way. If the deal is consummated, it is reported that an old factory at Lake Sunapee, N. H., will be converted into a main power station and the present plants of the companies held as reserve auxiliaries.

The Portsmouth Foundry Company, Portsmouth, N. H., which is seeking larger quarters, is negotiating for the foundry formerly owned by the Portsmouth Machine Company.

The Harrison Supply Company, Middlesbrough, England, will remove its machinery and business to Amesbury, Mass., where it is now equipping a plant. It makes stone-cutting machinery, tools and abrasives.

The Gunning Boiler & Machine Company, New Bedford, Mass., will build an addition, 48 x 67 ft., to its plant on South Water Street.

The plant of the Farist Steel Company, Bridgeport, Conn., was destroyed by fire Feb. 16, involving a loss of over $100,000. The buildings were of frame and will be replaced immediately with modern factory buildings. The boiler house was the only part of the plant left standing. The company was very busy on its regular domestic business and will suffer its greatest loss by the delay in rebuilding and in the loss of trade due to this delay. There will be considerable salvage in machinery and materials. The Farist Steel Company was originally located in Windsor Locks, Conn., moving to Bridgeport in 1865.

The United Electric Light Company, Springfield, Mass., is having plans drawn for a new power plant to be located at the foot of State Street. It will have a turbo-generator unit of 20,000 kw. capacity, a battery of 700-hp. boilers, automatic stokers and an overhead bunker holding 2000 tons of coal.

Vernon F. and Harry V. Prentice, formerly of Prentice Brothers Company, Worcester, Mass., whose business was absorbed in 1912 by the Reed-Prentice Company, have again started in the manufacture of machine tools at 54 Hermon Street, Worcester, where the old business was started 42 years ago.

The Burgess Company & Curtiss, Marblehead, Mass., aeroplanes, have sold their plant and business to the Curtiss Aeroplane & Motor Company, which recently acquired the Curtiss plant at Hammondsport, N. Y. No change will be made in management at the Marblehead plant. W. Starling Burgess is a director of the new company.

Cleveland

CLEVELAND, OHIO, Feb. 21, 1916.

The demand for turret lathes and automatic screw machinery from builders of automobiles and accessories, particularly in the Detroit territory, is again quite active. There was considerable buying from this source some time ago, but the automobile trade has been rather quiet recently. Automobile makers, further anticipating their 1917 requirements, are placing orders for turret lathes for fall delivery. The general demand for automatic machines continues heavy and most of the inquiries are for deliveries much earlier than can be furnished. The foreign demand at present is rather light. The demand among local dealers is very active, machines being wanted in lots up to 25 or more, mostly for plant extensions. The Cleveland Automatic Machine Company, which is enlarging its plant, placed orders the past week for about 30 machines. Makers of pneumatic tools are getting a heavy volume of orders from both domestic and foreign sources. Electric equipment is very active. The demand for cranes is unusually heavy and deliveries are slow.

The Cleveland Steel Valve Company, recently organized, has changed its name to the Redding Steel Valve Company. Its office at present is at 324 Garfield Building, Cleveland, Ohio. It has purchased the plant of the Seneca Chain Company, Kent, Ohio, which will be occupied as soon as equipment can be installed. The products will include steel plate gate, globe and angle valves. Harry B. Redding is manager. The company is now in the market for the following new or second-hand machinery:

16 to 24-in. turret lathes
Standard 12 to 30-in. engine lathes
Hand screw machines, 16-in. swing, with friction head
Vertical milling machines
Open-side planing machine up to 48 in.
24-in. shaping machines
Vertical and radial drilling machines, the latter up to 15 ft.
Two-stage air compressor, 350-cu. ft. per minute capacity
Plate shears with 48-in. capacity
One 60-in. plate straightening machine
Small motors, for driving the line shafting

The New York Central Railroad has an inquiry out for a plate shear with an 18-in. throat, 10 ft. between housings, for shearing plates up to ½ in. and for a double-end punch, with a 48-in. throat to punch 1¼-in. holes through a 1-in. steel plate. These machines will be installed in the Ashtabula, Ohio, shops.

The W. W. Sly Mfg. Company, Cleveland, Ohio, will add the building of cupolas, hoods and cranes to its present line of foundry equipment products.

The Marion Die Tool & Machine Company, Marion, Ohio, is the name of the new industry that has established a plant for the making of dies, reamers, jigs and small tools. E. W. Owens is manager.

The Union Metal Mfg. Company, Canton, Ohio, maker of ornamental lighting standards, at its recent annual meeting elected C. C. Barrick, president; C. L. Eshelman, vice-president; D. C. Barrick, secretary, and L. M. Barrick, treasurer.

The United Electric Company, Canton, Ohio, has bought out the Wise-Harrold Electric Company, New Philadelphia, Ohio, maker of suction sweepers.

The Timken Roller Bearing Company, Canton, Ohio, has awarded a contract for the erection of a two-story plant addition, 60 x 100 ft.

The Canton Motor Car Company, Canton, Ohio, has placed contracts for the erection of a new plant. It will be a two-story brick and steel structure, 66 x 200 ft.

The Acklin Stamping Company, Toledo, Ohio, has awarded a contract for a three-story factory, and is considering the erection of another five-story addition.

The Standard Steel Tube Company, Toledo, Ohio, has increased its capital stock from $150,000 to $300,000 to provide for improvements and extensions.

Indianapolis

INDIANAPOLIS, IND., Feb. 21, 1916.

The Great Western Mfg. Company, Laporte, Ind., manufacturer of bicycles, reports that the lowering of the cost of automobiles has had no effect in reducing the call for bicycles. It has 250 employees and is constantly adding to the number.

The City Council, Columbia City, Ind., rejected the bids for turbine engines for the enlargement of the municipal light plant. The engines were too large to be operatd on a paying basis. The council will ask for bids on 300-kw. machines.

The Showalter Brothers Furniture Company, Bloomington, Ind., has begun the construction of an administration building to cost $25,000.

The Public Service Commission of Indiana has approved an issue of $25,000 in bonds and $35,000 in stock by the Orleans Water Company, Orleans, Ind., recently incorporated, to build a waterworks system. The directors are J. B. Marvin, D. A. Coulter and M. K. Sparks.

It is announced that four new buildings will be added to the plant of the General Electric Company at Fort Wayne, Ind., this year, for which $1,000,000 has been appropriated.

The Indianapolis Light & Heat Company, Indianapolis, is completing plans for a new central station on the site of its present power plant, to cost $4,000,000. Contracts amounting to more than $100,000 for machinery were placed this week with the General Electric Company, all that the latter would bind itself to deliver this year. The equipment ordered includes a large turbine and a motor generator set.

The Lieber & Campbell Hardware Company, Hartford City, Ind., has changed its name to the Lieber Hardware Company. The new owners are J. M. Lieber, John Lieber, Harry McDonald and Ralph Hayden.

The Service Motor Truck Company, Wabash, Ind., has increased its capital stock from $250,000 to $450,000.

The Circuit Court has rescinded its order to sell the Angidile Computing Scale Company, Elkhart, Ind., and has ordered the continuation of the business by the receivers, C. R. Sawyer and John G. Sims.

So many orders for steam shovels have been booked by the Bucyrus Steam Shovel Company, Evansville, Ind., that it has abandoned the manufacture of machinery for making shrapnel. It has more than 200 employees.

Five band instrument factories at Elkhart, Ind., are closed because of the decision of the managers to abolish the closed shop, the brass workers and metal polishers quitting.

The Paoli Cabinet Company, Paoli, Ind., has increased its capital stock from $60,000 to $92,000.

The Edgerton Mfg. Company, Plymouth, Ind., has increased its capital stock from $75,000 to $250,000.

The Everett-Buschmann Company has been organized at Indianapolis, to manufacture power plant specialties. The directors are William J. Everett, Titus B. Everett and Alfred W. Buschmann.

The D & M Mfg. Company, Indianapolis, has been incorporated, with $12,000 capital stock, to make electrical appliances. The directors are Oscar Dietz, Clarence E. Mills and Walter D. Jones.

Edgerton & Co., Indianapolis, have been incorporated, with $5,000 capital stock, to manufacture furniture. The directors are Ralph H. Edgerton, Thomas L. Wayne and L. Lloyd Wayne.

Milwaukee

MILWAUKEE, WIS., Feb. 21, 1916.

While tool builders are straining every nerve to meet the demand, tool users are constantly increasing their demands by undertaking extensions and enlargement schemes forced upon them by their customers. From all parts of Wisconsin come reports of plant enlargement and the organization of new companies to engage in metal working. A Beloit disk grinding machine company is preparing to build another addition of the same size as one now being completed. The Kissel automobile works at Hartford are about to add a large shop. Important industrial activity is reported from Stevens Point, Madison, Superior and other large cities of the State. The extraordinary growth of the electric steel industry is shown further by the organization of a $100,000 corporation at Milwaukee to establish a foundry. The Allis-Chalmers Mfg. Company has taken a large hydroelectric equipment contract at Merrill and the city of Manitowoc closes bids on an electric generator requirement of considerable size. These are the first important contracts for this class of material to be let in a long time. The establishment of garages and small machine shops continues at a brisk rate and is responsible in a large measure for the bare used-tool market. Milwaukee construction figures show enormous gains over 1915. In all lines of business the feeling is very much improved.

Sealed bids for furnishing the city of Manitowoc, Wis., one 750-kw. turbo-generator and one 500-kw. generator will be taken by John J. Kelly, city clerk, until 4 p.m. Feb. 28, for the new combined electric light and waterworks pumping station. Check for 5 per cent is required with each bid.

A solid brick garage and repair shop, 45 x 120 ft., will be erected at North Avenue and Forty-fifth Street, Milwaukee, by G. Rummelin. Hugo Miller is the architect.

The H. Cary & Son Company, 407 Galloway Street, Eau Claire, Wis., is having plans prepared by Moores & Dunford, consulting engineers, 10 South LaSalle Street, Chicago, for a cold storage plant and warehouse to cost $75,000. Bids will be taken about March 1. It will be of reinforced concrete and brick, three and four stories, 110 x 140 ft.

The Nelson-Indra Machine Company, Green Bay, Wis., is working on several large woodworking equipment contracts, among them the motors, jointers, ripsaws, shafting, hangers and belts for the new planing mill of the Little Chute Lumber & Fuel Company, near Kaukauma, Wis., and a new sawmill in the Upper Peninsula.

Otto Fiske will erect a garage and machine shop at Mauston, Wis., for Carl Onsager, to be ready about May 15.

The American Potash Production Company, Milwaukee, has been incorporated with $10,000 capital by D. A. Sondel, Carl B. Rix and W. A. Walker.

The Claus Automatic Gas Cock Company, Milwaukee, now occupying leased quarters at 2601-2605 Vliet Street, has purchased a site on Keefe Avenue, near Booth Street, where it proposes to build a brass foundry and machine shop. Details are not yet available. Emil Claus is president and general manager.

The Kissel Motor Car Company, Hartford, Wis., has engaged Robert A. Messmer & Bro., 1004 Majestic Building, Milwaukee, to prepare plans for its proposed new machine shop and factory additions, to be erected this year on the 17-acre tract purchased a short time ago. Details will not be available for 30 days or more. George A. Kissell is president.

G. A. Leipold, 160 Martin Street, Milwaukee, is closing bids Feb. 22 for a new machine shop for the Milwaukee Dairy Supply Company, at Thirtieth and Burleigh Streets. The company is buying milling machines, lathe and planing tools, with individual motor drive. Gustave E. Strandt is president.

The Federal Engineering Company, 218 Stephenson Building, Milwaukee, is planning a garage and repairshop to be erected at Downer Avenue and Mineral Spring Road of concrete and steel, 70 x 140 ft., one and two stories, to cost about $15,000. The name of the owner is withheld.

Gottlieb Lenherr, Pittsville, Wis., has perfected a new stump-pulling rig operated by steam or gas tractor power, and is planning to manufacture it if sufficient capital can be enlisted. The device requires a tractor of 12 to 20 hp. to be purchased on contract.

The Gardner Machine Company, Beloit, Wis., maker of disk grinding machines, which recently started an addition to its machine shop, 60 ft. square, is preparing to make a second addition of similar size, because of the ever-increasing demand for its machines. Bookings are being made for delivery as distant as August and September. While its business figured about 80 per cent several months ago war orders, domestic demand has increased to such an extent that it now figures more than 80 per cent of the total.

The Denmark Light & Power Company, Denmark, Wis., has been incorporated for $15,000 by J. F. Eng, H. A. Dundey and H. F. Wittig.

The Automatic Cradle Mfg. Company, Stevens Point, Wis., manufacturer of self-rocking cradles, steel protecting devices for automobile tires and other specialties, is contemplating the erection of a new plant, three stories, 82 x 150 ft. John J. Bukolt, general manager and chief engineer, is planning to organize the tire protector and accessory business into a separate corporation with $100,000 capital, which will establish a plant of its own. This factory will contain 15,000 to 17,000 sq. ft. of floor space and be four stories. The company is now employing a day crew of 130 and a night shift of 50 men, each working 10 hr. Contracts for $3,500 worth of new wood and metal-working tools have just been placed with a Chicago company.

Fred Day, Jr., and John Day, Oconomowoc, Wis., have purchased the Greystone garage and machine shop at Fifth and Main Streets, Watertown, Wis., and will take immediate possession. Frank J. Shobolosky, formerly foreman of the machine shop of the Kissel Motor Car Company, Hartford, Wis., is associated with the Day brothers.

The Dawson Mfg. Company, Edgerton, Wis., has been incorporated with a capital stock of $25,000 by M. O. Dawson, W. W. Hammond and L. A. Anderson.

The Scanlan-Morris Mfg. Company, Madison, Wis., manufacturing steel hospital and office furniture, surgical instruments, etc., is building a new plant on the site of its works destroyed by fire a year ago. The company has occupied leased quarters since that time. The new plant consists of two machine shop and factory buildings, including offices and warehouse. Work has progressed sufficiently to permit of partial occupancy. The company has recently booked extensive domestic orders and several large orders from South Africa and other foreign countries. One of the largest orders now being filled is that for the entire equipment of the new infirmary of the Ford Motor Company at Detroit. It specializes in the equipment of industrial hospitals. The new plant will provide a capacity practically double that of the one destroyed.

Henry A. Ziola, Madison, Wis., is organizing a company which will have a capital stock of $100,000 to manufacture magneto and similar gas engine ignition devices. For some time he has contracted for the manufacture of his X-ray machine, which will be produced in the proposed shops at Madison.

The Lake Superior Electrical Company, Superior, Wis., commenced operations on Monday, Feb. 14, in leased quarters in the plant of the Superior Iron Works. The company announces that it has taken over the Universal Flashlight Signal Company, manufacturer of electric signals and whistle valves. A crew of 30 electricians is now employed.

The Pelton Steel Company, Milwaukee, filed articles of incorporation Feb. 18 with a capital stock of $100,000. The incorporators are Gustav A. Reuss, Fred Vogel, Jr., and William H. Schuchardt, all of Milwaukee. Details will not be ready for publication for at least a week; but it is admitted that the company will produce electric steel and is arranging for foundry quarters in the town of Lake, just south of Milwaukee. It is likely that the furnace installation will be of 3-ton capacity. The new corporation expects to perfect its organization about Feb. 24 and will then announce its plans.

The Simmons Mfg. Company, Kenosha, Wis., and the Rudgear-Merle Company, San Francisco, Cal., have been consolidated under the name of the Simmons Company. Z. G. Simmons was recently in San Francisco to consummate the deal. It is said that about 500 additional hands will be employed in the San Francisco plant, and all orders formerly supplied by the Simmons Mfg. Company west of the Rocky Mountains will be handled by the San Francisco plant. It was announced that an ornamental iron business will be conducted under the name of the Rudgear-Merle Company.

Cincinnati

CINCINNATI, OHIO, Feb. 21, 1916.

Somewhat conflicting reports are made by a number of machine-tool builders regarding the export trade. This demand is not at an end by any means, although current contracts are not as large as those placed last year at this time. The domestic demand has improved. Car manufacturers and autotruck makers have lately placed orders for different machines, and considerable business is pending from these sources. The railroads are only buying an occasional tool for replacement. The domestic call for portable electric drilling machines is excellent; some foreign business is also being booked. Small electric motors and generators are in good demand, but the larger units are slow. Nearly all the jobbing foundries are operating at full capacity.

The Advance Tool Company, Canal and Jackson Streets, Cincinnati, has been organized by George Langen, Jr., and

others, and is fitting up a plant to manufacture gages and small tools. All the necessary equipment has been purchased.

Plans for the proposed new plant for the R. K. LeBlond Machine Tool Company, Cincinnati, have practically been completed, but no date has been set for commencing work. It is not known what disposition the company will make of its plant in East End.

The Chicago Pneumatic Tool Company, whose Cincinnati sales offices are in the Mercantile Library Building, has leased quarters at 806 Sycamore Street, to be used exclusively by its motor truck department. W. L. Walker is manager of the department.

The Cincinnati Lathe & Tool Company, Oakley-Cincinnati, has let contract for a brick office building, 35 x 80 ft., two stories. Its present office space will be used for manufacturing purposes.

The Cincinnati Rubber Company, Norwood, Ohio, contemplates making an addition to its factory.

The Edgemont Machine Tool Company, Dayton, Ohio, has increased its capital stock from $25,000 to $75,000 and contemplates making an addition to its plant.

The Dayton Malleable Iron Company, Dayton, Ohio, has purchased the plant of the Ironton Malleable Iron Company, Ironton, Ohio, and will install additional foundry equipment.

The Ohio Parfay Company, 1110-1112 East Fifth Street, Dayton, Ohio, will fit up a bottling plant at an early date, equipment for which is estimated to cost $20,000.

The Dayton Casting Company, Dayton, Ohio, suffered a small fire loss last week, but no delay in the operation of its foundry occurred.

The Structural Engineering Company, Dayton, Ohio, has been incorporated with $100,000 capital stock by F. F. Lipp, H. M. Huffman and F. J. Hughes.

The Columbus Electrical Works Company, Columbus, Ohio, is having plans prepared for a new factory. It specializes in the manufacture and repair of electrical coal mining equipment.

Detroit

DETROIT, MICH., Feb. 21, 1916.

The J. E. Bolles Iron & Wire Works, Detroit, at the annual meeting of its stockholders held Feb. 15, announced that it would enlarge its plant by the erection of an addition, 43 x 130 ft., four stories, of reinforced concrete construction. The present officers and directors, headed by J. E. Bolles, president, were re-elected and Adam Kolb, Bay City, was added to the board.

The Columbia Motors Company, Detroit, has been organized by J. G. Bayerline, A. T. O'Connor, Edward Henderson and others prominent in the automobile industry, to manufacture motor cars. Arrangements for a factory will be made as soon as the organization is perfected.

The Michigan Stamping Company, Detroit, has increased its capital stock from $300,000 to $700,000.

The Inland Metal Products Company, Detroit, has been incorporated with $75,000 capital stock to manufacture automobile accessories, etc. The incorporators are Walter C. Boynton, C. Piquette Mitchel and James Swan.

The Continental Motor Mfg. Company, Detroit, manufacturer of automobile engines, has increased its capital stock from $2,900,000 to $5,900,000 and changed its name to the Continental Motor Company. It operates plants at Detroit and Muskegon, Mich.

The Liberty Motor Car Company, Detroit, recently organized, will occupy the former plant of the R-C-H Corporation. Percy Owen is president and general manager.

The J. C. Wilson Company, Detroit, has increased its capital stock from $20,000 to $225,000, and is about to embark in the manufacture of motor trucks on a large scale.

Howard P. Woodworth, Bay City, Mich., is president of a new company which will establish a plant at that point for the manufacture of automobile trucks.

The W. F. Stewart Company, Flint, Mich., manufacturer of automobile bodies, has announced that it will erect additions to its plant which will double its capacity.

The Electric Steel Company, Buchanan, Mich., has begun the erection of a large addition to its plant.

The Manistee Mfg. Company, Manistee, Mich., will erect a three-story addition to its factory.

The Field Motor Car Company, Grand Rapids, Mich., has been incorporated with $100,000 capital stock by E. A. Field, H. F. Baxter and J. W. Powers to manufacture a combination kerosene and gasoline engine.

The Light Car Axle Company, Chicago, will remove its plant to Kalamazoo, Mich., where a factory has been secured. S. C. Kyle and W. A. Jennings are at the head of the company.

Texas

AUSTIN, TEX., Feb. 19, 1916.

The Walker Refining Company, Austin, which recently built a plant for hardening cotton-seed oil, is arranging to construct a similar plant at Houston.

The secondary pumping station for the municipal sewage disposal station at Dallas will cost $10,000.

The Public Utilities Company, Carlsbad, New Mexico, will install new machinery in the local electric light and waterworks plant at a cost of about $10,000. A. J. Muzzy is president.

The building and machinery of the Athens Fire Brick Company, Athens, Tex., were destroyed by fire, with a loss of about $35,000.

The Texas Interlocking Cement Stave Silo Company, Fort Worth, will manufacture material for the building of concrete silos. William M. Keene is president.

The Parkersburg Tank Company, Houston, will manufacture tanks. John T. Crotty is a stockholder.

The Texas City Compress & Concentration Company, Texas City, has been organized with a capital stock of $30,000 to build and operate a cotton compress. J. H. W. Steele is in charge.

The Interstate Electric Company, New York, which recently purchased the local electric light and power plant at Ballinger, will install new machinery, etc.

Birmingham

BIRMINGHAM, ALA., Feb. 21, 1916.

The local machinery market is experiencing a good all around demand with prospects of an excellent spring trade. Electric appliances, woodworking machinery, mining equipment and agricultural machinery are all on the active list. Collections are good. Gasoline engines are especially active.

It is reported that the Mobile & Ohio Railroad will take over, enlarge and operate the Armstrong machine shop in Meridian.

E. H. Barnett, W. O. Alston and H. E. Riddell have incorporated the Oglesbee Granite Sawing & Polishing Mills, Atlanta, Ga., with a capital stock of $5,000, to manufacture granite shapes.

The Home Ice & Coal Company, Atlanta, has been incorporated by L. A. Jenkins, C. E. Roberts, Carl Wolfsheimer and others with a capital stock of $120,000.

G. Lloyd Preacher, architect, is preparing plans for a cotton compress and warehouse to be erected at Macon, Ga., by the Augusta Warehouse & Compress Company at a cost of $250,000.

The MacDonough Compress Company, Atlanta, Ga., has been incorporated with a capital stock of $500,000. W. H. Camp, N. B. Henry and others are stockholders.

The East Point Mfg. Company, East Point, Ga., has been incorporated with a capital stock of $10,000 to manufacture door and window screens, etc. George B. Argard and S. P. Murphy are stockholders.

Griffin & Wimberley, Enigma, Ga., have bought several miles of steam railway, lumber tract, etc., and will establish a sawmill.

W. H. Wesley, Point Washington, Fla., will establish a lumber plant of 30,000 ft. capacity.

It is understood that construction of the $1,000,000 terminal plant of the Terminal Transfer & Storage Company, Mobile, Ala., will start in the near future.

The Central South

LOUISVILLE, KY., Feb. 21, 1916.

Business continues good with local machinery companies, and the large number of inquiries and specifications on hand promise a good volume of business in the near future. The lull in the ice machinery trade continues, although indications are that rush orders will be received soon for late construction. Requirements for lighting and power are developing and electrically driven portable tools are in good demand.

The Puro Water Filter Company, Louisville, has been incorporated with $20,000 capital by Richard D., James G. and Fannie L. Bakrow, to manufacture an appliance for filtering and dispensing pure water. A manufacturing plant is considered.

Plans for erecting and equipping a plant to manufacture a patented rotary engine are being considered by the Recip-Roto Engine Co., Owensboro, Ky., incorporated with $400,000 capital. G. F. Moors is president and general manager; C. W. Wells, vice-president; T. A. Pedley, secretary and treasurer.

Boilers and machinery were lost when the sand-digger of the Carrollton Coal Company, Carrollton, Ky., overturned in the Ohio River. It is stated that the hull was recovered and that the machinery will be replaced.

Prices are being asked by the Glasgow Electric Light & Ice Company, Glasgow, Ky., on a 50-hp. 2300-volt, 60-cycle, three-phase, 900 r.p.m. slip ring motor, new or second hand.

W. E. Shelton will build a garage which will be fitted out as a salesroom and service station.

T. S. Shaw will erect a garage at Cadiz, Ky.

H. B. Webb, manager of the Coca-Cola Bottling Works, Campbellsville, Ky., is making arrangements to move the plant to another location and will make improvements.

Barney Hudson, Rockport, Ind., will fit out a plant to manufacture pearl buttons. This will be an enlargement of his present equipment which he will move into the new quarters.

The Southern States Construction Company, general contractors, Memphis, Tenn., is in the market for concrete mixers, pumps and general contractors' equipment.

The Dreamland Amusement Company, Maryville, Tenn., is asking for prices on a direct current generator, 15 kw. 220 volt, direct connected to kerosene engine.

Chattanooga, Tenn., has issued $2,000,000 in bonds and will purchase the waterworks system now supplying the city, or construct a new one.

Mayfield & Mayfield, Cleveland, Tenn., are building a garage at a cost of $4,100.

The Card Auto Company, Cleveland, Tenn., has let a contract to Stewart & Johnson, Chattanooga, Tenn., for a brick garage to cost $6,000.

Frank McKay J. A. Dougherty and others have incorporated the No-Leak Paint Mfg. Company at Nashville, Tenn., and are considering a plant.

The Belgium Dry Cleaning Company, Memphis, Tenn., has contracted with W. P. Hale of Osceola, Ark., for construction of a dry cleaning plant at a cost of $10,000.

Plans have been completed for immediately rebuilding the power plant of the Ruskin Cave College, Ruskin, Tenn., recently burned with a loss of between $10,000 and $15,000.

The T. H. Leinhart Company, Clinton, Tenn., is in the market for a second-hand return flue boiler, 30, 35 or 40 hp.

St. Louis

ST. LOUIS, MO., Feb. 21, 1916.

Machine-tool business continues to improve. Deliveries are now beginning to be made of equipment contracted for some time ago, when the acute shortage was first felt here. It is still far from a satisfactory state of affairs that exists, but the improvement is accepted as a promise for the future. The demand still keeps the market bare of all desirable equipment, both new and second-hand; and prices are of little consideration compared with delivery. Investment in new enterprises continues to grow and banking conditions are very easy. Collections are reported excellent in all lines.

The Hamilton Brown Shoe Company, St. Louis, Mo., will equip a factory at Poplar Bluff, Mo., with a capacity of 15,000 pairs daily.

The F. Brennan & Sons Metal & Rubber Company, St. Louis, Mo., scrap dealer, has been incorporated with a capital stock of $15,000 by F. Brennan and others. Its scrap handling plant is already in operation.

The Remmert Vacuum Cleaner Company, St. Louis, Mo., has been incorporated with a capital stock of $50,000 by William Remmert, Albert Marks and Clarence C. Scoles to manufacture vacuum cleaners, washing machines, etc.

The Louisiana Lumber & Cooperage Company, St. Louis, Mo., has been incorporated with a capital stock of $50,000 by Charles A. Clark, John Turner, and Bernard K. Leach of St. Louis and Aaron S. Cades, Tallulah, La., to equip lumber mills, etc.

The Glueck Box Company, St. Louis, Mo., will install additional mechanical equipment for the manufacture of wooden boxes, packing cases, etc., in additional plant space acquired therefor.

The Carr-Twombley Mfg. Company, St. Louis, Mo., has acquired a building of 69,000 sq. ft. of floor space, which it will equip with wood-working machinery for the manufacture of sash, doors and blinds.

Robert Blanke, St. Louis, Mo., is reported in the market for ice-cream making machinery, two 12-ton compressors, refrigerating machinery and other equipment for its plant at Cape Girardeau, Mo.

The Hannibal Wagon Company, Hannibal, Mo., has increased its capital stock from $75,000 to $350,000 for the purpose of increasing its manufacturing capacity.

The Capital City Iron, Metal & Wool Company, Jefferson City, Mo., has been incorporated with a capital stock of $12,000 by David Miller, J. S. Baer and A. Suder to equip and operate a scrap rehandling plant.

The Marionville Cold Storage Company, Marionville, Mo., has been incorporated with a capital stock of $35,000 by J. W. Coleman, C. W. Logan and J. E. Crumbaugh and will purchase equipment for the manufacture of ice, etc.

The Gregg Pump Company, Kansas City, Mo., has been incorporated with a capital stock of $40,000 by Walter S. Gregg, F. M. Duncan and May W. Gregg to manufacture pumps and other waterworks machinery.

The Koenig Wagon Company, Kansas City, Mo., has increased its capital stock by $20,000 to add to its wagon-making equipment.

The Western Tablet Company, St. Joseph, Mo., Eleventh and Mitchell streets, will equip a new power plant, including oil engine, storage battery system for lighting, etc.

The American Light & Power Company, St. Charles, Mo., will equip electric light systems at Wentzville and Wright City, Mo., shortly. F. E. Murray is district manager.

The Windsor Light & Power Company, Windsor, Mo., has been incorporated with a capital stock of $18,000 by J. C. Roberts, R. F. Williams and others.

The Carterville Sheet Metal Works, Carterville, Mo., will operate a machine shop and a planing mill, formerly conducted by F. C. Wallover, Joplin, Mo., who is president, and will add some new equipment.

I. Ben Miller, Cape Girardeau, Mo., will install ice-making and refrigerating machinery in connection with an existing plant.

The Ogden Electric Light & Power Company, Ogden, Ill., has been incorporated with a capital stock of $12,500 by H. V. Cardiff, Raymond Hunter, W. W. Sherman and C. A. Ludwick and will equip a public service plant.

The Monticello Iron Works, Monticello, Ark., has acquired a building and is in the market for mechanical equipment, including power plant, milling machines, lathes, etc. W. C. Byington is president.

Malvern, Ark., will install waterworks equipment and a sewage system, including a disposal plant to cost about $96,000. Bids will be received to March 1 for five pumps, etc.

The American Oil & Refining Company, Oklahoma City, Okla., has been incorporated with a capital stock of $1,000,000 by L. H. Pritchard, M. A. Luty and others to equip an oil refinery.

Ardmore, Okla., has plans for the equipment of a hydro-electric plant near that city on the Washita River at a cost of about $375,000. O. C. Lasher is finance commissioner.

The Superior Ice Company, Sallisaw, Okla., has been incorporated with a capital stock of $20,000 by W. M. and W. C. Gibson, Sallisaw, and A. F. Parkinson, Wagoner, Okla., and will install equipment at once.

The Nita Oil Company, Braman, Okla., is in the market for pumping equipment, etc. C. L. Hartman is in charge.

A re-icing plant will be equipped at Jackson, Miss., by the Illinois Central Railroad under the direction of A. S. Baldwin, chief engineer, Chicago, Ill.

Henry J. Cox & Company, Alexandria, La., are reported in the market for waterworks plant equipment and electric light plant machinery.

San Francisco

SAN FRANCISCO, CAL., Feb. 15, 1916.

Shop activities are increasing, and the demand for machine tools is strong, though the principal business closed is with shipbuilding plants. Many of the smaller shops have been hampered by lack of capital. Those in the agricultural districts, however, are in better financial condition than for several years, and expect a very busy year. The implement manufacturers are especially busy. Many shop operators say they cannot wait for the delivery of tools, and unless they have work actually booked for the distant future are simply doing the best they can with equipment on hand, adding such as they can pick up. Some good orders are coming through, and several inquiries of considerable importance are expected shortly. Several tools have already been ordered for the United Engineering Works, recently bought by the Union Iron Works, and further business is expected. Other shipbuilding shops are also figuring on additional equipment.

While many mines are closed, considerable inquiry is out for mining machinery, due to the high price of metals and the introduction of more economical processes of reduction. The lumber industry is not yet buying much. Power equipment and miscellaneous machinery are in good general demand.

The Regan Oil Tool Company has received a permit to operate shops for the manufacture of metal products on city land at Los Angeles Harbor.

It is reported that the Government of New South Wales will shortly be in the market here for 12 oil-burning marine engines.

A. L. Harlow, Yreka, Cal., will install a 500-hp. electric pump for irrigation purposes.

The Appliance Mfg. Company, San Francisco, recently organized by F. H. Thompson, formerly representative of the Westinghouse Electric & Mfg. Company in the Philippines, and J. H. Grainger, formerly construction engineer for the Allis-Chalmers Company, is starting the manufacture of an automatic priming device and fuel heater, which is said to permit the use of low-grade distillate in any internal-combustion engine.

The Western Pipe & Steel Company is preparing to build a new shop at its Los Angeles plant.

The superintendent of schools at Santa Barbara, Cal., is in the market for several lathes.

Canada

TORONTO, Feb. 19, 1916.

At the annual meeting of the Canada Cement Company, Montreal, held Feb. 16, F. P. Jones, general manager, explained that the company had received two separate war contracts, one calling for machining and the other for manufacturing steel and forgings, as well as machining. Orders on hand, he said, assured operations until the end of the year. The plant for making steel is expected to be ready by the end of the month, and by the end of March the company expects to be making forgings, besides machining work.

Following a refusal by the Steel Company of Canada, Hamilton, Ont., to concede an advance of 5 cents per hour the employees of the company, earning from 18½ to 30 cents per hour, about 700 of them, comprising about six nationalities, went out on strike Feb. 16. A meeting of the strikers was held and it is likely that a speedy settlement will be made.

William Kennedy & Sons, Ltd., Owen Sound, Ont., manufacturer of water power equipment, machinery, steel castings, etc., has taken over the plant of the old Cramp Steel Company at Owen Sound, and is remodeling it for the production of steel for munition and other purposes. The two 15-ton open-hearth steel furnaces are also being remodeled.

White & Thomas, 212 Simcoe Street, Toronto, are building an addition to their plant for the manufacture of galvanized iron products.

The Brown Copper & Brass Rolling Mills Company, Ltd., New Toronto, Ont., will build an addition to its plant to cost $25,000.

The Ontario Power Company, Niagara Falls, Ont., will install two additional units at its plant and will increase its generating capacity to 180,000 hp. It will also construct a pipe line 6000 ft. long by 18 ft. in diameter to supply the units. Construction work will be started in the spring and will cost about $3,000,000. B. G. Converse is manager.

The Canadian Niagara Power Company, Niagara Falls, Ont., will enlarge its forebay and add several generating units. The work will cost $2,000,000. Philip P. Barton is general manager.

The Ontario People's Salt & Soda Company, Kincardine, Ont., will receive bids until April 1 for the erection of an addition to its plant to cost about $15,000. John Tolmie is manager.

Plans are being prepared by A. R. Bartlet, Windsor, Ont., for the erection of a factory at Windsor or Walkerville, Ont., for the Chalmers Motor Company, Detroit, Mich., to cost $65,000.

London, Ont., will make extensive additions to its storm sewer system to cost $160,000. Chipman & Power, 204 Mail Building, Toronto, are the engineers.

Weyburn, Sask., will install an additional unit at its power plant to cost $35,000. E. H. Phillips is clerk.

The Dominion Government has approved the plans of the Amalgamated Dry Dock & Engineering Company, Vancouver, B. C., which will build a drydock and shipbuilding plant on the North shore. It will include a graving dock, buildings, marine railway and equipment, etc. J. L. Davidson is manager.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., is completing arrangements for the manufacture of war munitions at its Soo plant. The contract has been let to McPhail & Wright Construction Company for the erection of a building 120 x 350 ft., to cost $50,000. It has all its plants working to capacity.

The International Nickel Company has come to an agreement with the British War Office, whereby the latter will take about 20 per cent of the Nickel company's annual output. This is the largest single order ever accepted by the company.

The Briquette plant, machine shop, bank heads and boilerhouse of the Colonial Coal Company, Little Bras d'Or, Nova Scotia, has been destroyed by fire with a loss of $75,000.

The Peterborough Metal Products Company, Peterborough, Ont., manufacturer of laundry machinery, etc., has taken over the plant of the old Cordage Works and will remodel it and install machinery. A large forge plant will also be constructed.

The Weedon Chemical Company, Weedon, Que., is rebuilding its plant which was recently destroyed by fire with a loss of $60,000. The company will also build another factory for which it is now looking for a site.

The F. S. Carr Rubber Company has taken over the old factory of the Walpole Rubber Company, Granby, Que., and is installing a complete power system, including steam boilers, engines, generators, etc.

Filion & Freres, Ltd., Montreal, has been incorporated with a capital stock of $49,000 by Damase Filion, Alphonse Laverdure and others to manufacture and deal in machinery, engines, etc., for the construction of bridges, roads, wharves, etc.

Fire practically destroyed the plant of the Northumberland Paper & Electric Company at Campbellford, Ont. The loss will be very heavy as a large amount of valuable machinery was destroyed.

Fire caused $30,000 damage to the forge department of the Turcot plant of the Canada Car & Foundry Company, with a loss of about $60,000, will rebuild at once.

The A. B. Jardine Company, Hespeler, Ont., whose plant for the manufacture of shells was recently destroyed by fire with a loss of about $60,000, will rebuild at once.

Pumps & Power, Ltd., 224 Abbott Street, Vancouver, B. C., is in the market for a 15-hp., three-phase motor, also a 5 to 10-hp. steam engine.

S. Smith, Port Sydney, Ont., is in the market for a marine engine, fore and aft, 6 x 10 or 12 x 9 in., with condenser.

The Canadian Electrode Company, Ltd., a subsidiary of the Shawinigan Water & Power Company, Montreal, is erecting a large plant at Shawinigan Falls, Que., for the manufacture of carbon electrodes, etc.

The Canadian Cartridge Company, Ltd., Toronto, has been incorporated with a capital stock of $750,000 by Reginald H. Parmenter, 85 Bay Street; Arthur J. Thomson, 132 Balmoral Avenue; William S. Morlock, 107 Roxborough Street West, and others of Toronto, to manufacture cartridges, ammunition, machinery, tools, etc.

The London Gas Power Company, Ltd., London, Ont., has been incorporated with a capital stock of $100,000 by William H. Heard, John W. G. Winnett, London, Ont., and others to manufacture machinery, tools, etc.

The Amalgamated Ammunition Machinery Company, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by Henry J. Martin, 6 Adelaide Street East; Charles A. Snowdon, Thomas N. Poole, 67 Brunswick Avenue, and others to manufacture machinery, tools, war munitions, etc.

The Waterland Motor Company, Ltd., Walkerville, Ont., has been incorporated with a capital stock of $300,000 by William R. Woollatt, C. M. Bennett, Walkerville, Ont., and Oliver A. Light, Indianapolis, Ind., and others to manufacture automobiles, trucks, etc.

The Hamilton Gear Machine Company, Toronto, has let contract for an addition to be made to its plant at Concord Avenue and Van Horne Street.

Government Purchases

WASHINGTON, D. C., Feb. 21, 1916.

The chief of ordnance, War Department, Washington, will receive sealed proposals until March 1 for five caterpiller type gasoline tractors, f.o.b. Fort Sill, Okla.

The supervising architect, Treasury Department, Washington, will receive sealed proposals until 3 p. m., March 13, for the installation of an elevator pump at Omaha, Neb.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Feb. 15, schedule 9223, steam engineering, class 56, for Pensacola—two motor-driven bench lathes—Pratt & Whitney Company, $1,437; class 57, one universal milling machine—Brown & Sharpe Mfg. Company, $1,502; class 58, one cylindrical automatic grinder—Brown & Sharpe Mfg. Company, $2,868 and $1,790; Landis Tool Company, $2,250; class 59, one vertical surface grinder—Pratt & Whitney Company, $2,935.

NEW TRADE PUBLICATIONS

Reinforced Concrete Construction.—Westinghouse, Church, Kerr & Co., 37 Wall Street, New York City. Brochure. Gives a brief idea by illustrations of the scope of the operations in reinforced concrete that have been carried on by this company. Among those illustrated are a dam, a set of lime kilns and a large factory.

Tire Chains.—American Chain Company, Bridgeport, Conn. Wall hanger calendar measuring 10 x 29 in. The adaptability of the Weed tire chains to all four seasons is emphasized by the use of four pictures framed by an automobile tire and chain in each case. The hanger is remarkably free from advertising and the whole twelve months are printed in small but legible figures at the bottom of the hanger, which has a little pasteboard tube at the bottom to prevent curling.

Gas Machines.—Tirrill Gas Machine Lighting Company, 103 Park Avenue, New York City. Pamphlet. Gives details of a machine that can be installed in a factory, laboratory, or store to supply gas when there are no mains of a public utility company available. A brief description of the machine which charges air with gasoline vapor to produce the gas is given followed by a description of the various appliances for factory and laboratory use in connection with this system. The descriptions of the appliances are supplemented by engravings of the devices and tables of the sizes which can be supplied.

Lifting Magnets.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Folder. Relates to the recently made increase in the capacities of lifting magnets amounting to from 20 to 60 per cent. A view of one of these magnets in use for handling pig iron is presented, and attention is called to the reductions that can be effected in the cost of handling material, due to the decrease in the number of lifts required. Mention is also made of a line of industrial control apparatus with special reference to a magnetic lockout type accelerating switch. A number of views of this device for controlling skip hoists, roll and transfer tables, cranes, pumps, etc., in the various steel plants of the country are included.

Fabricated Steel Structures.—McClintic-Marshall Company, Pittsburgh, Pa. Portfolio. Size, 11¼ x 13 in.; pages, 48. Gives a collection of typical structures furnished and erected by this company, including bridges, buildings, etc. The engravings presented show foundries, steel plants, automobile factories, open-hearth plants, tube mills, locomotive works, railroad shops, pier sheds, railroad depots, warehouses, office buildings, bridges of various types, viaducts and the lock gates at the Panama Canal. A list of the various steel structures that the company is prepared to manufacture and erect is given and mention is made of the service that it can furnish in the general construction of factory and mill buildings. Views of the plants of the company are included.

Hydraulic Operating Valves.—Diamond Machine Company, Monongahela, Pa. Folder. Illustrates a three-way hydraulic operating valve for use wherever water under pressure furnishes the power for operating machinery, etc. A brief description of the valve, which is made of solid bronze with beveled fiber disks is given, and this is supplemented by a statement, in some detail, of the way in which the valve operates. The advantages claimed for the valve are freedom from leakage due to the way in which the fiber is held in place, ease of operation and maintenance of pressure. An illustrated description of the valve appeared in THE IRON AGE, Oct. 7, 1915.

Belt Treatment.—Cling-Surface Company, Buffalo, N. Y. Calendar hanger. Size, 9¼ x 15¼ in. The upper portion of the calendar contains a flapped engraving showing a 16-in. double leather belt used in a granite quarry for driving an air compressor running tight and the same belt running with considerable slack after being treated. A brief statement of the conditions existing at the plant before and after the belt was treated is given on the back of the flap.

Tanks.—Hamburg Boiler Works, Hamburg, Pa. Catalog No. 5. Shows a line of tanks for all classes of service, such as blow-off, drip, pressure, elevator, receiver and sprinkler work and for storing water, gas and oil. Tables of the sizes that can be furnished for each class of service are given, together with the capacity and each table is preceded by a brief statement regarding the thickness of the material used and the riveting of the seams. Rules for ascertaining the working pressure of the tanks and dimension diagrams for the various fittings are included.

Blowing Engines.—Mesta Machine Company, Pittsburgh, Pa. Bulletin H. Describes and illustrates a line of blowing engines of the vertical long cross-head and steeple types for steam operation and a horizontal engine employing blast furnace gas as fuel. The descriptive matter in the bulletin deals almost entirely with the air end of the engine, references being made to the bulletins describing the steam and gas engines used for the power end. Mention is made of the plate type of valve used with these engines and the factors entering into the question of whether steam or gas engines are to be used for the driving power are briefly discussed.

Stampings.—Bettcher Mfg. Company, Cleveland, Ohio. Catalog. Lists a great variety of stampings from 0.002 in. in thickness and upward, which are made in a great variety of styles and sizes. The products include washers, automobile and bedstead stampings, pipe hangers, beam clamps and clips, floor and ceiling plates, chain links, flat keys, felloe plates, fuse caps, etc. All of the various products are illustrated and tables of the different sizes of each that can be supplied are included. Mention is also made of the facilities which the company has for finishing its products by galvanizing, sherardizing, tinning, nickel-plating, etc.

Shell Turning Lathe.—Cincinnati Iron & Steel Company, Inc., Cincinnati, Ohio. Catalog. Pertains to a lathe for turning shells from 3 to 12 in. in diameter. The lathe, which was illustrated in THE IRON AGE, Oct. 7, 1915, is built in two sizes. A description of the lathe and the various attachments that can be supplied for it are presented and the results of a number of tests that have been made are included.

Molding Machine and Pneumatic Vibrator.—Mumford Molding Machine Company, 2059 Elston Avenue, Chicago, Ill.—Two circulars. The first describes a power rock-over drop molding machine having pneumatic power for rolling over the mold and drawing the pattern. The description of the machine and its operation is supplemented by two views of the machine, one in combination with an electrically-operated jarring machine. The other circular presents an illustrated description of a pneumatic molding machine vibrator which was illustrated in THE IRON AGE, Sept. 30, 1915. The special features of the vibrator are the use of a drop forged steel body and a socket on the match board to receive the extension from the vibrator. Illustrations of the vibrator and the socket attachment used with it supplement the text description.

Foundry Repair Mixture.—Joseph Dixon Crucible Company, Jersey City, N. J. Leaflet. Treats of a mixture of crucible clay and graphite designed for use in brass and iron foundries and in gas works for patching, lining ladles and cupolas, stopping tap holes, etc. Instructions for using the material are given.

Safety Goggles.—Julius King Optical Company, 10 Maiden Lane, New York, Catalog. Lists the different models of safety goggles that can be fitted with Saniglas lenses. The various advantages of these lenses, such as clearness, absence of color, toughness and thickness, are briefly touched upon. The goggles shown include different styles having an adjustable bridge, and for use around welding and grinding machines and in galvanizing and riveting departments. Brief descriptions of the several goggles supplement the engravings. A number of views of the goggles in which the lenses have been damaged but saved the eyesight of the wearer are included and give mute testimony as to the efficiency of the protection afforded by the lenses.

Portable Acetylene Lights.—Alexander Milburn Company, 1420 West Baltimore Street, Baltimore, Md. Catalog No. 23. Illustrates and describes a line of portable acetylene lights for use by contractors, industrial plants, mines, quarries, railroads, etc., where powerful outdoor illumination is required. After a series of views showing the lights in use on different classes of construction work, the features of simplicity, absence of parts subject to damage and the fact that no attention is required during use are touched upon, followed by views with brief descriptions and condensed specification tables of the various styles of lights that can be supplied. These include portable and stationary outfits with one or more burners, as well as a lighting and heating burner employing kerosene oil, gas and acetylene headlights and marine beacons. Directions for setting up and using the lights are given and a table of repair parts with instructions for ordering is included. Mention is made of oxy-acetylene welding and cutting of steel and a number of views of the apparatus in use are given.

Die Forming Machine and Cutters.—Anderson Die Machine Company, Bridgeport, Conn. Bulletin No. 1. Illustrates and describes a machine for finishing blanking dies and similar work after the core or surplus stock has been removed by drilling. A description of the machine, which is motor driven, the power being derived from the nearest lamp socket, is presented, the text being supplemented by engravings of the machine and some of the more important parts. The special advantage claimed for this machine is rapidity, due to the fact that the cutters do not have to be changed for every variation of contour of the surface. Mention is made of the various cutters that can be supplied for use with the machine.

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